

# 7,62 mm AUTOMATIC RIFLES AND LIGHT MACHINE GUNS

— DESCRIPTION, HANDLING,  
MAINTENANCE AND FIRING —

All rights concerning alteration and supplement  
are reserved exclusively by the author. No part of  
this book may be reprinted, published or transla-  
ted into any other language without the written per-  
mission of the author

*Zavodi Crvena Zastava*  
Kragujevac — Yugoslavia

## 7,62 mm AUTOMATIC RIFLES AND LIGHT MACHINE GUNS

Description, handling, maintenance  
and firing

1985.

Printed by »Nikola Nikolić« — Kragujevac

## C O N T E N T S

### C h a p t e r I

#### PURPOSE, DESCRIPTION AND HANDLING

	Page
1. PURPOSE AND COMBAT CHARACTERISTICS . . . . .	9
2. DESCRIPTION OF RIFLE AND LIGHT MACHINE GUN . . . . .	12
3. PURPOSE, TYPES AND DESCRIPTION OF AMMUNITION . . . . .	46
1) Cartridge 7,62 mm . . . . .	46
2) Antitank rifle grenade M60 . . . . .	49
3) Antipersonnel rifle grenade M60 and M60P1 . . . . .	52
4) Smoke rifle grenade M62 . . . . .	56
5) Illuminating rifle grenade M62 . . . . .	59
6) Practice antitank rifle grenade . . . . .	62
7) Practice antipersonnel rifle grenade . . . . .	63
4. STRIPPING AND ASSEMBLING OF WEAPONS . . . . .	65
5. OPERATION OF PARTS OF THE WEAPON . . . . .	80
1) Position of parts of the weapon before loading . . . . .	80
2) Operation of parts during loading . . . . .	81
3) Operation of parts when commencing burst fire . . . . .	83
4) Operation of parts when commencing single fire . . . . .	84
5) Fire commence with rifle grenades and arming of the fuze . . . . .	85
6) Safe position of the weapon . . . . .	87
6. STOPPAGES DURING FIRING AND HOW TO ELIMINATE THEM . . . . .	88
7. FIRING ACCURACY AND PRECISION TESTING . . . . .	90
8. TESTING OF ACCURACY AND PRECISION IN FIRING OF THE WEAPONS EQUIPPED WITH PASSIVE SIGHT 5x80 . . . . .	96
9. TESTING OF ACCURACY IN FIRING WITH RIFLE GRENADES . . . . .	97

### C h a p t e r II

#### KEEPING AND MAINTENANCE OF WEAPON AND AMMUNITION

1. KEEPING OF WEAPON AND AMMUNITION . . . . .	99
1) Keeping of weapon . . . . .	99
2) Keeping of ammunition . . . . .	100
2. BASIC MAINTENANCE OF WEAPON AND AMMUNITION . . . . .	102
1) Inspection of automatic rifle . . . . .	102
2) Inspection of light machine gun . . . . .	105
3) Inspection of ammunition . . . . .	106

	Page
3. CLEANING AND LUBRICATION . . . . .	107
1) General regulations . . . . .	107
2) Means for cleaning and lubrication . . . . .	109
3) Procedure of cleaning and lubrication . . . . .	109
4. DECONTAMINATION OF WEAPONS AND AMMUNITION . . . . .	112

### Chapter III

#### F I R I N G

1. GENERAL REGULATIONS . . . . .	115
2. PREPARATION FOR FIRING . . . . .	121
1) Firing positions . . . . .	121
(1) Lying position . . . . .	121
(2) Kneeling position . . . . .	123
(3) Sitting position . . . . .	125
(4) Standing position . . . . .	126
(5) Firing position from the stand or behind the shelter . . . . .	127
(6) Firing positions from skis . . . . .	132
(7) Firing positions with rifle grenades . . . . .	135
(8) Positions for firing at air targets . . . . .	139
(9) Choice of place and firing position . . . . .	141
2) Observation of battlefield and choice of target . . . . .	141
3) Determination of distance to the target . . . . .	142
(1) Visual estimate . . . . .	142
(2) Direct measurement . . . . .	144
(3) Estimate by angular size of a known object . . . . .	145
4) Choice of sight and aiming point . . . . .	146
5) Commence fire . . . . .	148
(1) Firing at stationary targets . . . . .	154
(2) Firing at sudden targets . . . . .	154
(3) Firing at movable targets . . . . .	154
(4) Firing at camouflaged targets . . . . .	158
(5) Firing in motion . . . . .	159
(6) Firing under conditions of limited visibility . . . . .	160
(7) Firing in the mountains . . . . .	163
(8) Firing under protective mask . . . . .	163
(9) Firing at air targets . . . . .	163
(10) Firing with rifle grenades . . . . .	166
6) Cease of fire and stop firing . . . . .	170
7) Change of firing site . . . . .	170
Appendices . . . . .	173

#### INTRODUCTION

This book is based on the manual »Automatic rifles and light machine guns 7,62 mm« for the needs of Yugoslav Army.

The book includes description, handling, maintenance and firing with automatic rifles and light machine guns based upon the cartridge 7,62 × 39 mm. Since these two weapons are similar with a lot of interchangeable parts, the book applies to both weapons; only those parts which are specific for each type of the weapons are separately dealt with. The book also describes all types of rifle grenades and how to fire them.

Upon customer's request the rifles can be delivered without grenade launcher and built-in grenade launching sight (see Fig. 1c). However, such rifles are not intended for firing with rifle grenades.

Upon customer's request also all the rifles and light machine guns may be delivered with built-in mount on the receiver of the weapon to provide for possible application of passive sight (Fig. 1d) for night firing or scope for daylight firing.

Knowledge and usage of this book is a prerequisite for proper use and application of the weapons and combat training and skill of soldiers (users).



## Chapter I

### PURPOSE, DESCRIPTION AND HANDLING

#### 1. PURPOSE AND COMBAT CHARACTERISTICS

**1. Automatic rifle (AR) 7,62 mm M70B1 and M70AB2** (Fig. 1) is used to destroy personnel and firearms of the enemy. The rifles equipped with grenade launcher and grenade launching sight can successfully destroy armoured and other combat vehicles, bunkers, fortifications; they can make smoke curtain and



a) Automatic rifle 7,62 mm M70B1



b) Automatic rifle 7,62 mm M70AB2



c) Automatic rifle 7,62 M70B1 without grenade launching sight



d) Automatic rifle 7,62 mm M70AB2 with passive sight PN5x80

Fig. 1 — Automatic rifle

illuminate the ground. When necessary, the rifles and light machine guns may be provided with the base upon which the passive sight for firing at night (Fig. 1d) or optical sight for firing at day (sniper) can be installed.

When firing at personnel the best results can be achieved with single fire at the ranges up to 400 m, with short bursts up to 300 m and with long bursts up to 200 m. Concentrated fire by

several shooters at discovered and group targets can be successful at the ranges up to 600 m.

Grenade launcher with an antitank grenade is efficient up to 150 m, and with an antipersonnel or smoke grenade up to 240 m.

Illuminating rifle grenade is the most effective when launched at the angle of 45°.

**2. Light machine gun (LMG) 7,62 mm M72B1 and M72AB1** (Fig. 2) is an automatic weapon intended for neutralization and



a) Light machine gun 7,62 mm M72B1



b) Light machine gun 7,62 mm M72AB1

Fig. 2 — Light machine gun

destruction of enemy's personnel and firearms at ranges up to 800 m. The best results can be achieved with sudden fire at ranges up to 600 m.

LMG 7,62 mm M72AB1 can be installed on armoured vehicles whereat its stock is to be folded and its bipod removed.

3. The weapons (AR and LMG) can efficiently fire at low-flying aircrafts and helicopters and parachutists at ranges up to 500 m.

Automatic rifles and light machine guns can be used for single, burst (short bursts up to 5 and long burst up to 15 rounds) and sustained fire.

4. Weapon are loaded by a 30-round magazine, while LMG can also use a 75-round drum. Practical rate of fire is 120 and cyclic rate of fire is 600 rounds per minute. When firing with rifle grenades from AR, the rate of fire is 3—4 grenades per minute.

5. For firing is used live ammunition 7,62 mm with normal and tracing bullet.

The light machine gun is operated and carried by the gunner.

## 2. DESCRIPTION OF RIFLE AND LIGHT MACHINE GUN

6. Automatic rifle consists of the following parts: barrel, sights, gas chamber with gas port stop, gas cylinder with handguard, recoil mechanism, bolt carrier with piston, bolt, receiver cover, receiver with handgrip, trigger mechanism, stock, grenade launcher, knife, magazine and accessories.

Light machine gun consists of the following parts: barrel, sights, gas chamber, gas cylinder with handguard, recoil mechanism, bolt carrier with piston, bolt, receiver cover, receiver with handgrip, trigger mechanism, stock, bipod, magazine — drum and accessories.

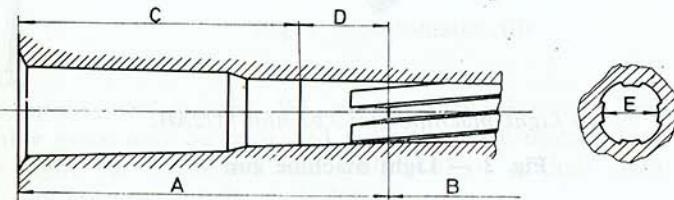


Fig. 3 — Barrel, rear internal part (section)

A — cartridge chamber, B — bullet leading section, C — cartridge case seat, D — leading cone, E — caliber

7. **Barrel** (Fig. 3 and 4) is used to fire the cartridge and to give direction and rotary motion to the bullet. Inside the barrel there are cartridge chamber and rifled section. The rifled section is grooved and has 4 grooves and 4 lands with righthand twist. Rear interior part of the barrel is cylindrical and grooveless and is called cartridge chamber. Barrel is joined with the receiver by pressing and secured against longitudinal displacement by the barrel fixing pin.

Front part of the barrel is provided with threads for fitting of muzzle protecting ring, blank ammunition attachment, grenade launcher or recoil compensator.

The following elements are firmly joined — fitted on the barrel: front sight base, gas chamber, rear sight base and forehand (handguard) front folder. On the part where gas chamber is

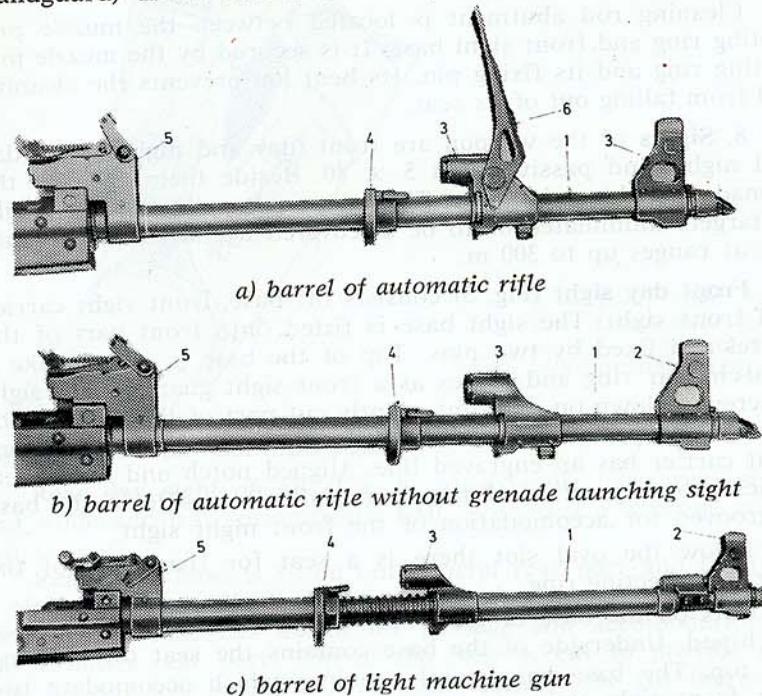


Fig. 4 — Barrel, external view

1 — barrel, 2 — front sight (day and night), 3 — gas chamber, 4 — forehand (handguard) front folder, 5 — rear sight

6 — grenade launching sight

fitted there is a slant slot for passage of powder gases. The barrel of LMG is also provided with fitted and fixed cleaning rod abutment.

Central part of the barrel of LMG (Fig. 4d) is provided with ring-type grooves for better and easier cooling. Under the last ring on the top side of the barrel there is an oval groove which accommodates the securing pin of forehand (handguard) front holder.

Muzzle protecting ring on LMG serves to protect the threads and barrel muzzle. It is secured by its fixing pin located in the front sight base.

Beside protection of barrel muzzle the recoil compensator on AR also serves to reduce angle of jump of the rifle in burst fire.

Cleaning rod abutment is located between the muzzle protecting ring and front sight base. It is secured by the muzzle protecting ring and its fixing pin. Its bent lug prevents the cleaning rod from falling out of its seat.

**8. Sights** of the weapon are front (day and night), rear (day and night) and passive sight 5 × 80. Beside them, AR has the grenade launching sight, too. The best results with the night sight at targets illuminated or to be discovered by flash can be achieved at ranges up to 300 m.

**Front day sight** (Fig. 5) consists of: base, front sight carrier and front sight. The sight base is fitted onto front part of the barrel and fixed by two pins. Top of the base is shaped like a semi-circular ring and serves as a front sight guard. Front sight is screwed down on it. Front, slantly cut part of the oval slot of the base is provided with an impressed notch while the front sight carrier has an engraved line. Aligned notch and line determines proper position of the front sight. Rear side of the base is grooved for accommodation of the front night sight.

Below the oval slot there is a seat for fixing pin of the muzzle protecting ring.

Cuts on the base of LMG limit longitudinal displacement of the bipod. Underside of the base contains the seat for cleaning rod top. The base has lateral openings which accommodate two pins, front night sight pin and front night sight spring pin.

On its rear part above the cuts which limit turning of bipod legs around the barrel, the front sight base of the light machine gun M72AB1 has a semi-circular groove along which the bipod legs holder stop slides.

**Front night sight** is placed in a groove on the front sight base and fixed by its pin. Front night sight spring is connected to the pin and holds the sight in selected position. On its top the night sight has a circular surface 4 mm in diameter coated with radioactive illuminating mass.

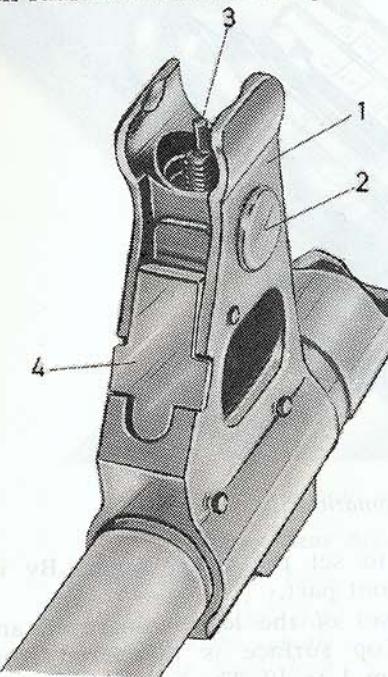
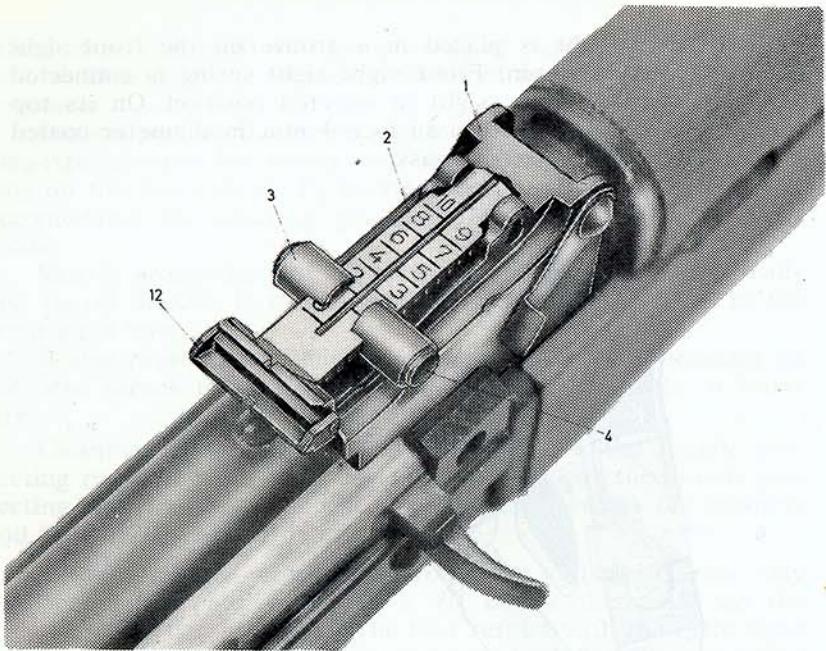


Fig. 5 — Front day and night sight

**Rear day sight** of AR (Fig. 6) consists of: base, rear sight leaf, slide and leaf spring, while LMG possesses a windage scale, too.

Rear sight base is fitted onto barrel rear part and fixed by a pin. It is longitudinally slit to enable the piston to pass. Front part of the base has a slot for passage and accommodation of gas cylinder rear part. Top of the base is cut to provide seating for the leaf spring and at both sides of the cut there are two curved surfaces which enable the leaf to be set to the height specified. On the base rear part there is a semi-circular groove into which the front part of receiver cover fits. On the right-hand side of the base there is the gas cylinder lock fixed to the base front part by a pin.

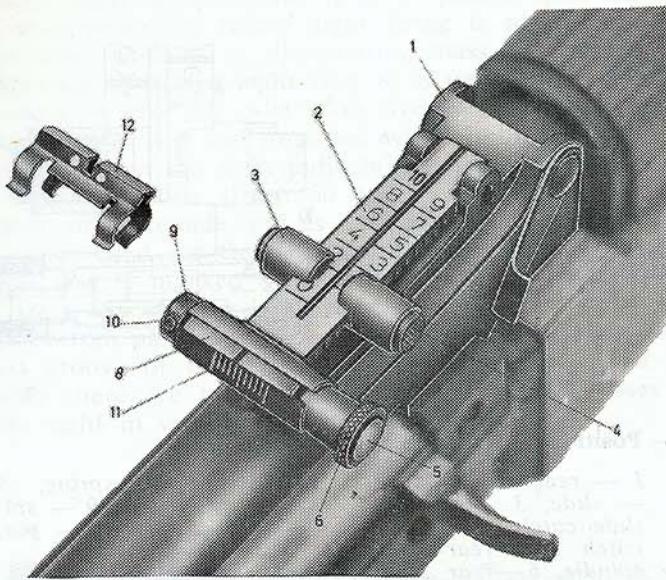


a) for automatic rifle

Leaf with its slide serves to set the firing range. By its shoulder it is fixed to the base front part.

Top (on LMG underside also) of the leaf is engraved and each division means 1000 m. Top surface is numbered from 0 to 10, and the bottom one from 1 to 10. The bottom divisions are used to set the firing range in lying position. Division »0« corresponds to the division »3« and is used for firing at air targets. On the leaf rear part with LMG there is a seat for windage scale. The slide consists of body, fixing pin and spring. The seat for windage scale has divisions with total value of twenty mils (0—20), the value of one division being two mils (0—02).

**The windage scale** (Fig. 7) serves for setting of lead when firing at movable targets and for elimination of effects of lateral wind. It consists of rear sight, spindle, drum, spring and nut. The rear sight has a slot for aiming in the middle and can be horizontally moved through its spindle by turning the drum. To move the rear sight by one division it is necessary to turn the drum by 1,5 circle. The spindle is a helical one; on its top there is a nut screwed down and secured by a pin.



b) for light machine gun

Fig. 6 — Rear day and night sight

- |                          |                        |
|--------------------------|------------------------|
| 1 — rear sight base,     | 8 — rear sight, 9 —    |
| 2 — rear sight leaf, 3 — | spindle nut, 10 — pin, |
| slide, 4 — slide catch,  | spindle nut, 11 — win- |
| 5 — rear sight spindle,  | dage scale, 12 — rear  |
| 6 — rear sight lock,     | night sight            |

The drum is fitted on the spindle from the right; one of its sides is provided with knurling for easier turning while the other one has two lugs for fixing in required position. The spring is fitted onto the spindle and secured in position by the nut and drum.

Basic position of the windage scale is when the rear sight notch is aligned with the central (longer) line on the seat for windage scale.

**Rear night sight of AR** is fixed by its pin to the leaf rear side. It includes body, pin and spring. On the top surface of the body there is an aiming slot and two circular surfaces of radioactive illuminating mass 2 mm in diameter.

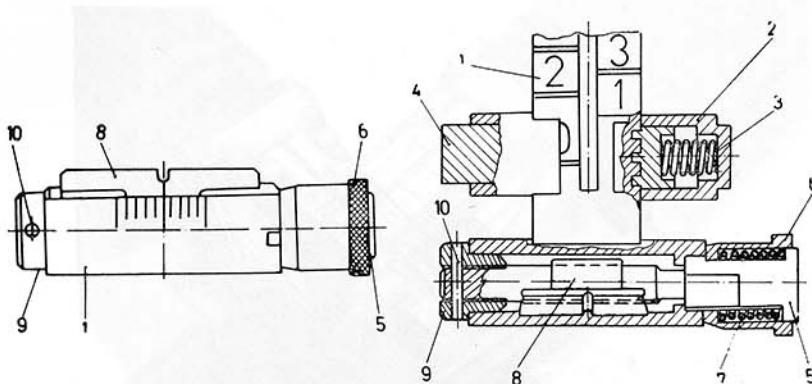
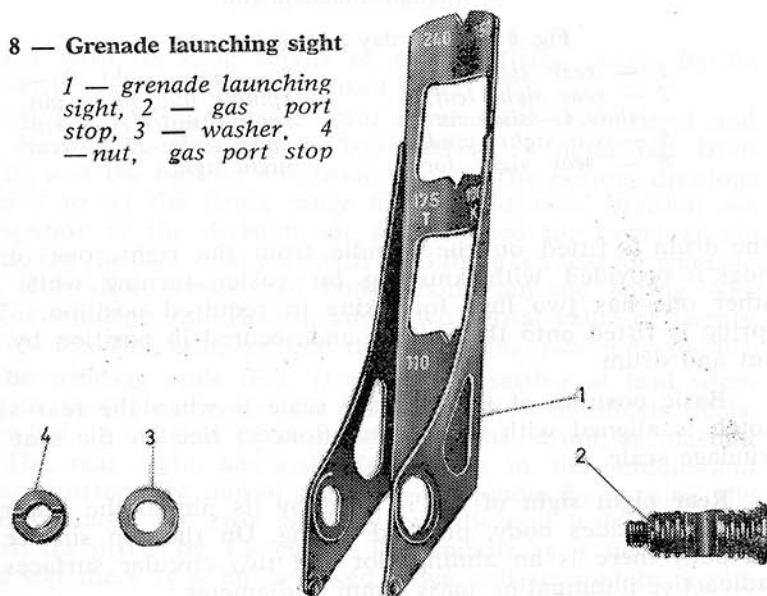


Fig. 7 — Position of the parts of windage scale

1 — rear sight leaf, 2 — slide, 3 — spring, 4 — slide catch, 5 — rear sight spindle, 6 — rear sight  
lock, 7 — spring, 8 — rear sight, 9 — spindle nut, 10 — pin, spindle nut

Fig. 8 — Grenade launching sight

1 — grenade launching sight, 2 — gas port stop, 3 — washer, 4 — nut, 5 — gas port stop



Rear night sight of LMG is to be placed upon the leaf rear part when necessary (when night firing is anticipated), turning the circular surfaces of illuminating mass toward yourself.

**Grenade launching sight** (Fig. 8) is fixed to the gas chamber by means of the gas port stop. Arcs on the sight are suited to the grenade rim and provided with aiming slots in the middle. Numbers on the sight indicate distance expressed in metres. The right-hand side (from 50 to 150) is used for firing with antitank rifle grenade and is marked by letter »K« while the left one is used for firing with antipersonnel and smoke rifle grenade and is marked by letter »T«. On the right side of the sight there are circular holes for passage of gas port stop while on its bottom part there are two bosses which slide along the curved groove of the gas chamber. On both sides of the gas chamber there are two circular slots where the bosses fit and fix the sight in vertical and horizontal position.

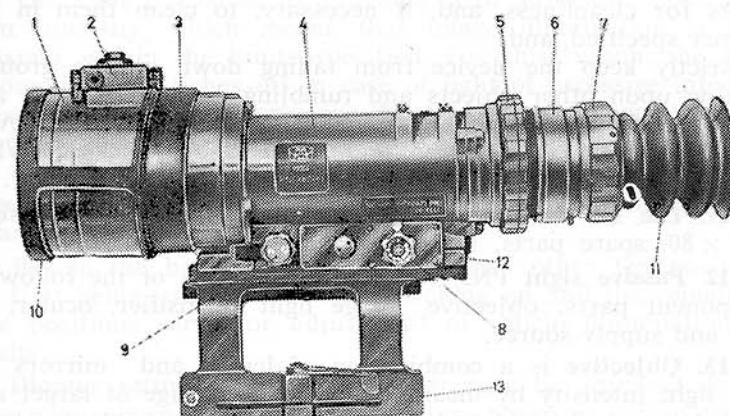


Fig. 9 — Passive sight PN5×80 with its mount

1 — objective, 2 — reticle system holder, 3 — objective housing, 4 — light intensifier, 5 — range setting ring, 6 — ocular, 7 — dioptr setting ring, 8 — voltage switch, 9 — shutter position setting button, 10 — rubber protective cap, 11 — rubber eyeguard, 12 — mounting feet, 13 — passive sight mount.

**9. Passive sight PN5×80** (Fig. 9) is an electronic-optical device intended for field observation, aiming and firing at night at ranges up to 500 m. Its operation is based on the principle

of utilization of low-intensity white light (light of the moon, stars and other natural sources). By means of the passive sight it is possible to detect successfully and under favourable conditions also to fire at all devices of IR technique used by the enemy for viewing and firing at night. It is not possible to discover the passive sight by aiming—viewing (IR or other electronic) devices of the enemy.

**10. Passive sight** PN5 × 80 is sensitive to light sources of higher intensity. It requires careful handling and regular maintenance; for this reason it is necessary to observe strictly the following precautions:

- never aim the device toward the sun or any other intensive light source even with the objective cap on;
- if the rubber protective cap has become damaged through daylight or other intensive light and dirt, the objective must be protected in some other way;
- before and after usage it is obligatory to check optical elements for cleanliness, and, if necessary, to clean them in the manner specified, and
- strictly keep the device from falling down on the ground, striking upon other objects and tumbling during transport and carrying. When used in the rain and high humidity, the device should be thoroughly wiped and dried before packing. When not used, the device is kept in the case with closed cover.

**11. The set of passive sight** includes the passive sight PN5 × 80, spare parts, tools and accessories.

**12. Passive sight** PN5 × 80 (Fig. 9) consists of the following component parts: objective, image light intensifier, ocular, reticle and supply source.

**13. Objective** is a combination of lenses and mirrors of high light intensity by means of which the image of target and ground area is formed and transmitted to photo cathode of the intensifier. For neutralization of parasitic light, the rims of lenses, mirrors and other reflecting objective elements are dyed black.

All objective elements are placed in the same housing which accommodates the intensifier and reticle, too. Objective front part is protected by a rubber protective cap which can be taken off only at night.

The following parts are located on external surfaces of the housing: range setting ring, voltage switch, shutter position setting button, mounting feet for fixing the sight to its mount, system holder and seat for rechargeable battery.

**Rubber protective cap** protects the device from light of excessive intensity. At the same time it protects the objective from mechanical damages.

To provide for aiming at daylight (rectification), there are four small holes on the front face of the rubber protective cap to allow for passage of light.

**Range setting ring** serves to obtain sharp image of observed objects (targets) at distances from 30 m to infiniteness. For distances shorter than 30 m it is not possible to get a completely sharp image of observed objects.

To make distant targets sharper the ring should be turned clockwise.

**14. Image light intensifier** is a three stage electronic tube with fibre optics. Its purpose is to intensify the light received by at least 30.000 times while retaining the image within the magnification limits (5x).

The light intensifier is provided with automatic control of light intensity, which means that image illumination is kept constant within the limits specified. For this reason, the sight automatically switches off in case of light of excessive intensity thus protecting observer's eye from dazzling. When excessive light intensity drops the device switches on again automatically.

**Voltage switch** is intended for switching on/off of current voltage and for adjustment of reticle illumination intensity in regards to target image.

Beside the basic one, this switch has other ten positions the first being used for voltage switching on and the remaining nine positions serve for adjustment of reticle illumination intensity.

**Diopter setting ring** of the ocular may be adjusted depending upon sharpsightedness of shooter—observer within the limits of ±5 diopter. On the ring and body underside there are two bosses which allow for setting of diopter divisions at night, too.

**15. Ocular** is intended for observation of picture, ground and reticle. It includes: body, lens system, diopter setting ring and rubber eyeguard.

**Rubber eyeguard** protects shooter's head from possible injuries caused by rifle recoil during firing. On the rear part of the rubber eyeguard there is a mechanism with movable shutter which opens by pressing upon the eyeguard and closes when the pressure stops. It serves to prevent light from going

out of the device and making reflection on the face of sniperist (observer), thus reducing possibility of discovering position of the sniperist (observer).

**Shutter position setting button** is intended for elimination of detrimental effect of excessive light coming from the horizon or any other intensive light source in the upper half of the field of view of ocular.

16. **Reticle system** is situated in the holder and the reticle itself on longitudinal axis of the passive sight between objective lenses. The reticle is used for aiming by means of the passive sight.

The reticle is illuminated by a special light source. Intensity of aiming mark illumination can be adjusted by means of the knob.

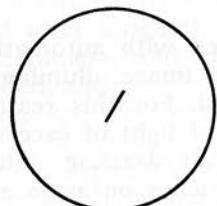


Fig. 10 — Reticle

The reticle (Fig. 10) is in the form of an illuminating line vertically positioned in the field of view, and its value is nine mils 0—09. Method of aiming by means of the reticle depends upon target distance and conditions under which rectification of the rifle has been made.

**Reticle system holder** is situated on the front top part of the housing. Elevation adjustment screw is located on its front, and traverse adjustment screw on its left side.

Possibility of shifting the reticle at rectification is as follows: per traverse 0—23 to the left and 0—23 to the right, and per elevation  $\pm 0—23$ . Shifting step (accuracy of reading) is 0,5 mil. To move the reticle within the field of view to the right the respective screw should be turned clockwise while turning anticlockwise will move the reticle to the left. By doing this the centre of impact is shifted to the opposite side. In order to move the centre of impact upward the reticle should be shifted downward by turning the respective screw clockwise. To move the centre of impact downward the reticle should be shifted upward by turning the respective screw anticlockwise.

17. The device is supplied by a NiCd rechargeable battery of 2,48 V and through a high-voltage converter built into the light intensifier. Capacity of the battery is 0,7Ah.

When empty, the battery is to be charged by a 70 mA charger for maximum 14 hours. Life of the battery without reticle illumination is 15 hours and with reticle illumination 10 hours.

Seat of the rechargeable battery is fixed to the right side of the housing and closed by a cover. The cover represents »ground« in the current circuit of the device. Since the device cannot operate without the cover be careful not to lose or damage it.

18. **Mounting feet** for fixing the passive sight onto its mount are standard type and serve for installing the device onto various types of weapons. The passive sight is to be fixed to its mount by two screws.

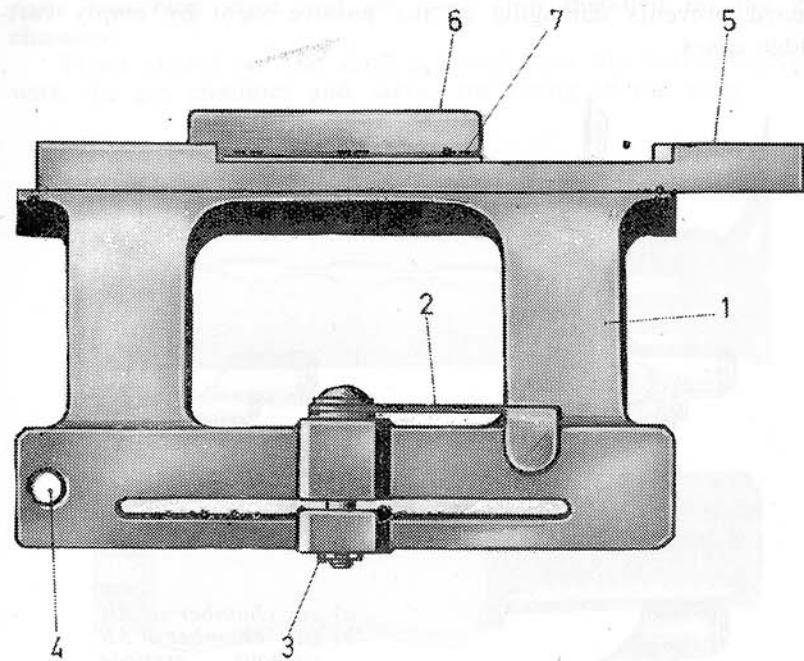


Fig. 11 — Parts of passive sight mount

1 — body, 2 — wing lock, 3 — securing pin, 4 — stop, 5 — base of passive sight mount, 6 — guard, 7 — screw

**19. Passive sight mount** (Fig. 11) and the base on receiver of the weapon fix optical sight to the weapon (2, Fig. 18). The mount includes body, wing lock, securing pin for it, passive sight mount with guard, and stop.

Mount body joins together all component parts of the mount into a whole. It has a longitudinal groove for fitting the passive sight mount onto the base on the left side of the rifle (LMG). On the central bottom part of the mount body, there is the wing lock with its securing pin which fixes and secures the mount body to the base. By means of the securing pin it is possible to clamp the mount body to the receiver of the rifle (LMG).

On the top flat surface of the mount body two screws fix the base which carries the passive sight secured by four screws. Other three screws fix a sheet metal guard to the base; the guard prevents damaging of the passive sight by empty cartridge cases.

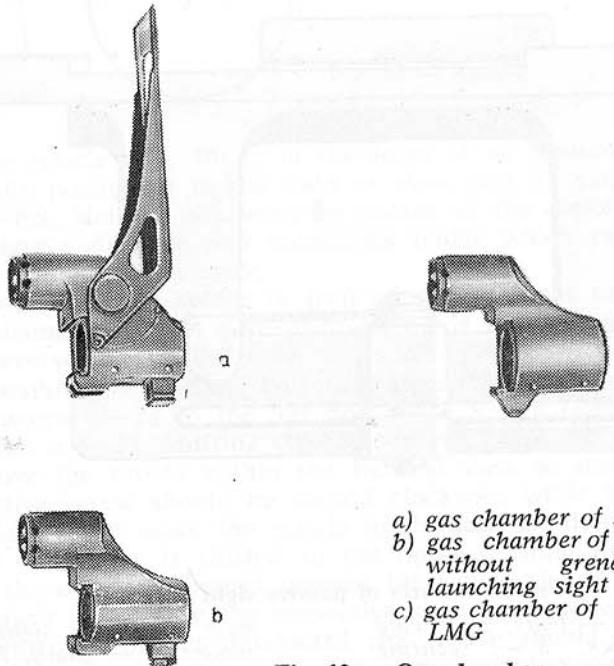


Fig. 12 — Gas chamber

**20. Gas chamber with gas port stop** (Fig. 12) is fitted on the barrel and fixed by the pins. Through a slant opening powder gases pass from the barrel into the chamber. On the top side of the chamber there is a cylindrical lug whose front end has an external narrowing upon which front part of the gas cylinder leans. Each of lateral sides of this part of the chamber has two circular holes for leakage of powder gases. On the bottom part of the chamber there is a lug for installing the knife on AR, and an opening through which the cleaning rod passes.

Gas port stop of AR is located within the chamber and serves to close the port for gas supply when firing with rifle grenades. It has a semi-circular slit in the middle for passage of gases. A washer on its lateral side and a nut screwed on fix the grenade launching sight and gas port stop. **Note: Automatic rifles without the grenade launcher do not have the grenade launching sight and gas port stop installed on the gas chamber.**

Front swivel for the sling is fitted onto the barrel together with the gas chamber and serves for fixing of the sling.

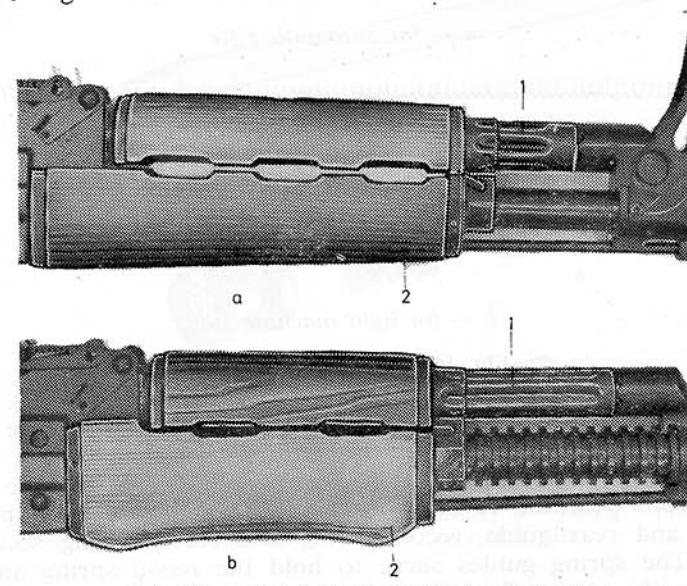
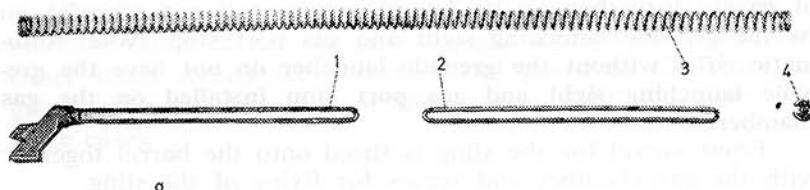


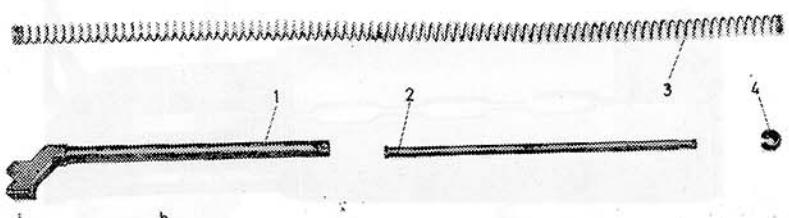
Fig. 13 — Gas cylinder with handguard

a) for automatic rifle      1 — gas cylinder,  
b) for light machine gun      2 — handguard

**21. Gas cylinder with handguard** (Fig. 13) serves for accommodation and guidance of the piston and protection of shooter's hands from burns during firing and carrying the weapon. The gas cylinder is fixed by its lock. Upper part of the handguard encloses the gas cylinder and it is secured by holders. Lower part of the handguard encloses the barrel and by its front end leans upon the holder while its rear reinforced end rests against the receiver. Holder of the handguard lower part is fitted onto the barrel and secured by its securing pin. The holder and handguard lower part have a longitudinal slot for passage of the cleaning rod. The handguard lower part has a built-in metal segment by which the handguard leans upon the barrel.



*a — for automatic rifle*



*b — for light machine gun*

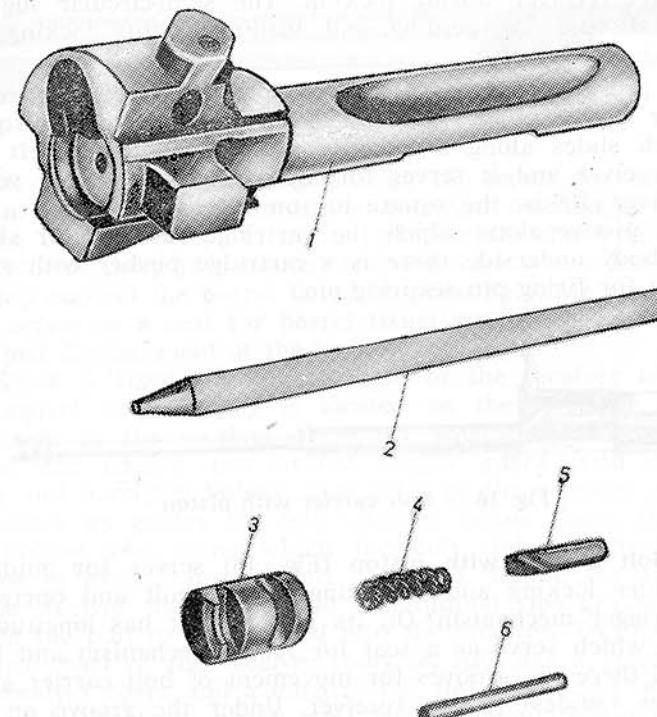
**Fig. 14 — Recoil mechanism**

1 — rear guide, 2 — coil spring, 4 — recoil spring securing ring  
front guide, 3 — re-

**22. Recoil mechanism** (Fig. 14) is used to return the bolt into front position. It includes the following component parts: front and rear guide, recoil spring and recoil spring securing ring. The spring guides serve to hold the recoil spring and to ensure its proper function when fire commences. Front guide has top ends bent toward one another and they are to be fitted into corresponding openings on the recoil spring securing

ring. Rear guide has on its end a reinforced protrusion and a lug for fixing the receiver cover. On the bottom part of the reinforced protrusion there are two longitudinal ribs which fall into corresponding grooves on the receiver.

Recoil spring securing ring on AR has lateral slits and a hole into which bent ends of the front guide fall while on LMG it has a lateral slot and is to be fitted onto cut part of the front guide.



**Fig. 15 — Component parts of the bolt**

1 — bolt body, 2 — firing pin, 3 — extractor, 4 — extractor securing pin  
spring, 5 — extractor shaft, 6 — firing pin

**23. Bolt** (Fig. 15) is used to push the cartridge from magazine into the barrel, to lock the barrel, to fire the cartridge, to unlock the barrel, to extract the cartridge case and to cock

the hammer. The bolt includes the following component parts: body, firing pin, extractor, extractor spring, extractor shaft and firing pin securing pin.

On the front part of the bolt body there is a circular slot for cartridge case bottom and an oval slot for extractor. Within the circular slot there is a hole through which the firing pin passes. On the top surface of the body there is a semi-circular lug which fits into a semi-circular groove on the right side of the receiver during locking. The semi-circular lug has a profiled boss for guiding and turning during locking and unlocking of the bolt.

The profiled boss has a vertical opening to accommodate the extractor shaft. On the left side of the body there is a square lug which slides along a longitudinal groove on the left side of the receiver and it serves for locking and unlocking within the receiver. Below the square lug on the body there is a longitudinal groove along which the cartridge case ejector slides. On the body underside there is a cartridge pusher with a circular slot for firing pin securing pin.

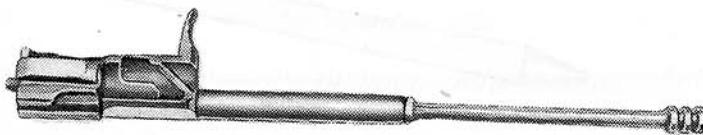


Fig. 16 — Bolt carrier with piston

**24. Bolt carrier with piston** (Fig. 16) serves for guidance and enables locking and unlocking of the bolt and operation of the trigger mechanism. On its rear side it has longitudinal openings which serve as a seat for recoil mechanism and bolt. Laterally, there are grooves for movement of bolt carrier along bent sides (guides) of the receiver. Under the groove on the right side there is a lug which presses upon the full automatic sear lever to prevent premature firing. Bolt carrier has a handle on its right side. On the underside there is a profiled groove along which profiled boss of the bolt moves.

Front part of the piston is expanded forming a head with two circular grooves and three sealing rings. On its rear end the piston has a ring-shaped enlargement and a spiral part for coupling with the bolt carrier. The piston is secured from self-unscrewing by a pin.

**25. Receiver cover** (Fig. 17) serves to close the receiver (from above) and to protect the parts located inside from dirt. By its front end it leans against the semi-circular groove of the rear sight base while its rear end falls into cross groove of the receiver. On its right side there are step-like slots for ejection of cases and movement of the bolt handle. Its rear side has a square slot for cover catch which fixes the receiver cover.

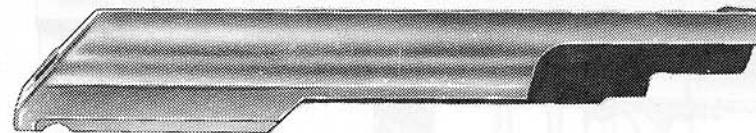


Fig. 17 — Receiver cover

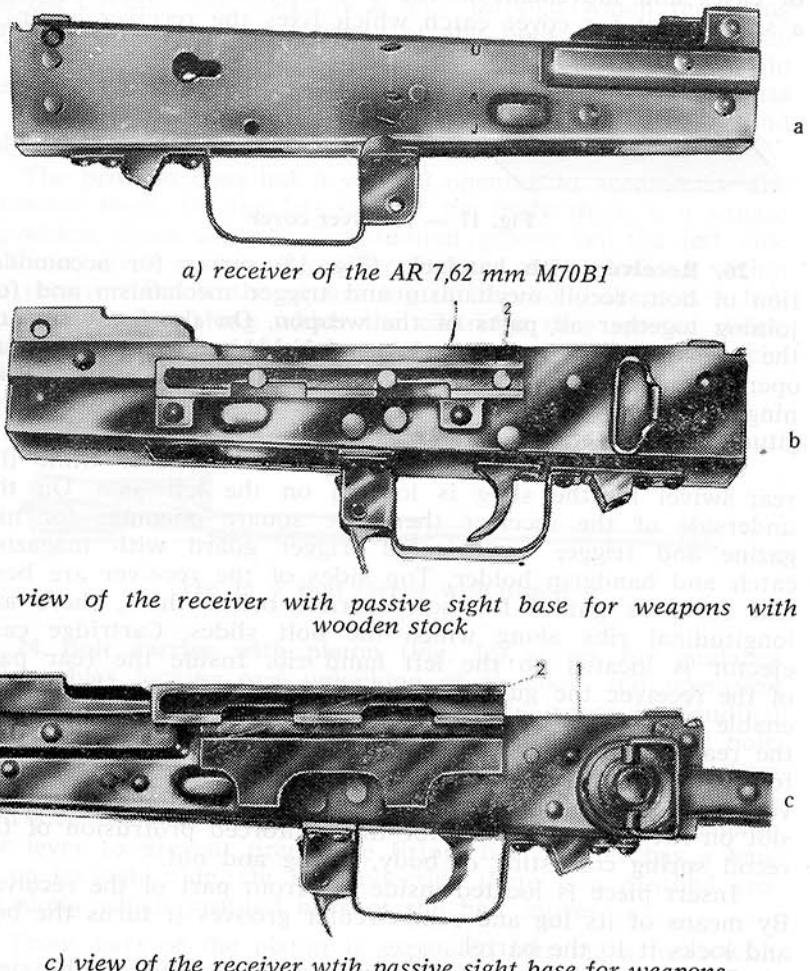
**26. Receiver with handgrip** (Fig. 18) serves for accommodation of bolt, recoil mechanism and trigger mechanism and for joining together all parts of the weapon. On the front side of the receiver there is a riveted barrel holder whose longitudinal opening accepts the barrel fitted by pressing while a cross opening serves as a seat for barrel fixing pin which prevents longitudinal displacement of the barrel.

Stock is fixed to the rear side of the receiver while the rear swivel for the sling is located on the left side. On the underside of the receiver there are square openings for magazine and trigger and riveted trigger guard with magazine catch and handgrip holder. Top sides of the receiver are bent and serve as guides for bolt carrier; below them, there are longitudinal ribs along which the bolt slides. Cartridge case ejector is located on the left hand rib. Inside the rear part of the receiver the guides and longitudinal ribs are broken to enable the bolt to be inserted into the receiver. Top surface of the rear part of the receiver (only on AR) has a cross groove for receiver cover and a longitudinal slot for fitting of the cover catch of recoil spring rear guide. Below the longitudinal slot on AR there is a lock for the reinforced protrusion of the recoil spring consisting of body, spring and nut.

Insert piece is located inside the front part of the receiver. By means of its lug and semi-circular grooves it turns the bolt and locks it to the barrel.

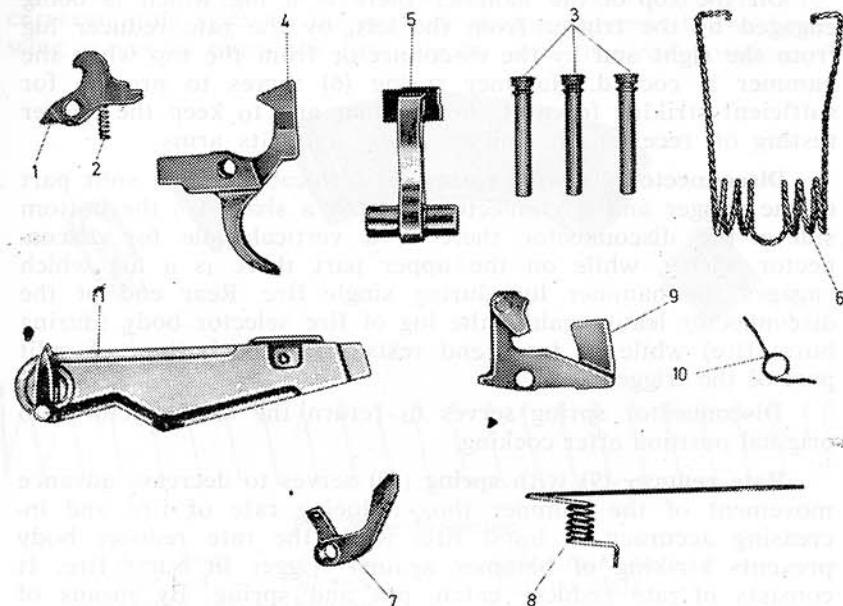
The following letter designations are engraved on the right side of the receiver: U-safe, R-burst fire, and J-single fire. Beside the basic model designation, the rifles and light machine guns provided with built-in passive sight base on the left ex-

ternal side of the receiver are also marked by the letter »N«. For example AR 7,62 mm M70B1N. Figure 18b shows the passive sight base for weapons with wooden stock, while the Figure 18c shows the passive sight base for weapons with metal folding stock.



**Fig. 18 — View and parts of the receiver**  
1 — receiver, 2 — passive sight base

**27. Trigger mechanism** (Fig. 19) is used for cocking and firing, for automatic and single fire and safe position of the weapon. It includes trigger with shaft, hammer with hammer spring and axle, disconnector with spring, full automatic sear with spring and shaft, rate reducer with spring and fire selector.



**Fig. 19 — Triggering mechanism**

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1 — disconnector,               | 2 — disconnector spring        |
| 3 — trigger, hammer             | and full automatic sear shaft, |
| 4 — trigger,                    | 5 — hammer,                    |
| 6 — hammer spring,              |                                |
| 7 — full automatic sear,        |                                |
| 8 — full automatic sear spring, |                                |
| 9 — rate reducer,               |                                |
| 10 — rate reducer spring,       |                                |
| 11 — fire selector.             |                                |

Trigger (4) with shaft (3) is used for holding the hammer in cocked position and for firing. On the upper part of the trigger there is a tapered lug through which the hammer is cocked. Rear part of the trigger has two arms supporting rear ends of the hammer spring. The trigger is slit to allow for passage of the shaft. Lower part of the trigger ends with a profiled lug for pulling.

**Hammer** (5) with **hammer spring** (6) strikes the firing pin and fires the round. Through its axle the hammer is connected with the receiver. On its lower part there is a catch which rests upon the full automatic sear lug and shoulders onto which the hammer spring is fitted. The shoulders are provided with a hole for hammer axle which fixes the hammer to the receiver.

On the top of the hammer there is a lug which is being engaged by the trigger from the left, by the rate reducer lug from the right and by the disconnector from the top when the hammer is cocked. Hammer spring (6) serves to provide for sufficient striking force of the hammer and to keep the trigger resting on receiver bottom by acting upon its arms.

**Disconnector** (1) with **spring** (2) is located in the split part of the trigger and is connected to it by a shaft. On the bottom side of the disconnector there is a vertical hole for disconnector spring, while on the upper part there is a lug which engages the hammer lug during single fire. Rear end of the disconnector leans against the lug of fire selector body (during burst fire) while its front end rests upon the bottom of split part of the trigger.

Disconnector spring serves to return the disconnector into original position after cocking.

**Rate reducer** (9) with **spring** (10) serves to decrease advance movement of the hammer thus reducing rate of fire and increasing accuracy in burst fire, while the rate reducer body prevents striking of hammer against trigger in burst fire. It consists of rate reducer catch, pin and spring. By means of the pin, the catch is fixed to the body lug and leans upon the hammer lug from the right. The spring keeps the catch always pressed forward. Rate reducer body is fixed to the receiver by the trigger shaft and pressed down to the receiver bottom by the spring.

**Full automatic sear** (7) with **spring** (8) and **shaft** prevents firing until locking of the bolt is completed. It consists of body and lever. On the left side of the body there is a semi-circular groove for longer arm of the spring. The body has a lug which goes under the hammer lug. The spring has two arms, longer and shorter. The former fits into the semi-circular groove on the trigger, hammer and sear body shaft thus preventing them from falling out of the receiver. The latter, located in a hole on the left side of the sear body lug keeps pressing the sear backward thus returning it into original position after firing.

**Fire selector** (11) consists of body and lever. It is intended for fire selection (single or burst) and for safe position of the weapon. Fire selector body is split on the top to enable free passing of lower part of the bolt carrier. On the bottom side there is a lug through which fire selection and safe position is to be effected. Fire selector lever is firmly connected with the body. Its front part is provided with a boss which falls into corresponding slots on the receiver during movement. The bent wing serves to move the fire selector into required position.

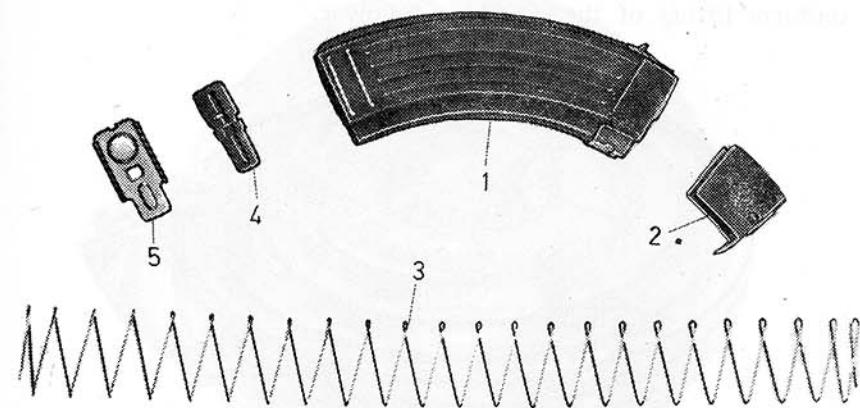


Fig. 20 — Magazine

1 — body, 2 — follower,  
3 — follower  
spring, 4 — bottom  
plate lock piece, 5 —  
bottom plate

**28. Magazine** (Fig. 20) serves to accommodate 30 rounds and to load the weapon. It consists of body, bottom plate, bottom plate lock piece, cartridge follower and follower spring.

**Magazine body** joins together all parts of the magazine. Lateral sides are bent on top to prevent the rounds from falling out and to limit lifting of the follower. Front side of the body has the magazine notch while on the rear one there is the magazine lug which fixes the magazine to the receiver.

**Bottom plate** closes the magazine from underneath and serves as a rest for the spring. It has a hole for the bottom plate lock piece.

**Bottom plate lock piece** is inseparably fixed to the spring bottom end and has a lug which keeps the bottom plate from displacement.

**Cartridge follower** is located inside the body and connected with the spring upper end by a bent piece on the right side. It is provided with a lug which ensures uniform two-row arrangement of rounds. In addition to this basic function, the cartridge follower plays also the role of cartridge retainer, its rear surface being shaped in such a manner as to retain the bolt in rear position after the last round from the magazine has been fired.

**Follower spring** is situated within the body and used for uniform lifting of the cartridge follower.

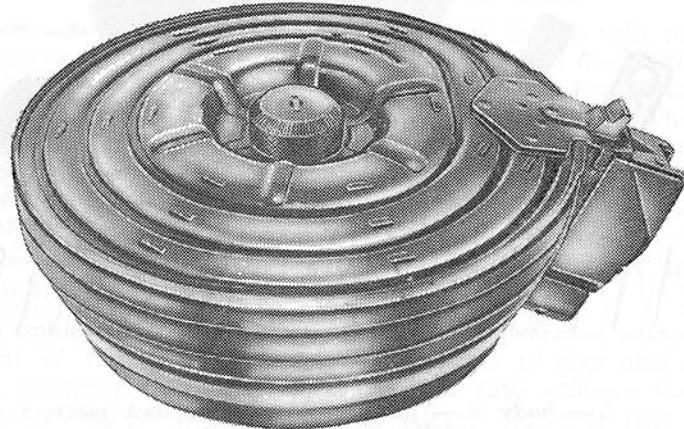


Fig. 21 — Drum

**29. Drum** (Fig. 21) is loaded with 75 rounds. It consists of body, cover, feeder with spring, follower, loading handle with pawl, lock piece with spring and clips.

**Body** (Fig. 22) joins together all parts of the drum. It has cartridge mouthpiece, feeder shaft, cartridge guide, spiral, a slot for pawl and a hole for loading handle spring end.

Cartridge mouthpiece gives direction to cartridges during loading into cartridge chamber. It connects the drum to the receiver. Lateral sides of the mouthpiece are bent and together with the cartridge retainer they keep the cartridges from falling out and guide them toward the cartridge chamber. On front side there is a catch connecting the drum to the receiver. The rear side has a lug which secures the drum in position.

Feeder shaft has on its inner side a hole for lock piece with spring while on its ends there are lugs and grooves for clips; besides, it has three catches for feeder spring and a slot for the lock piece which retains the feeder on its shaft when the cover is taken off.

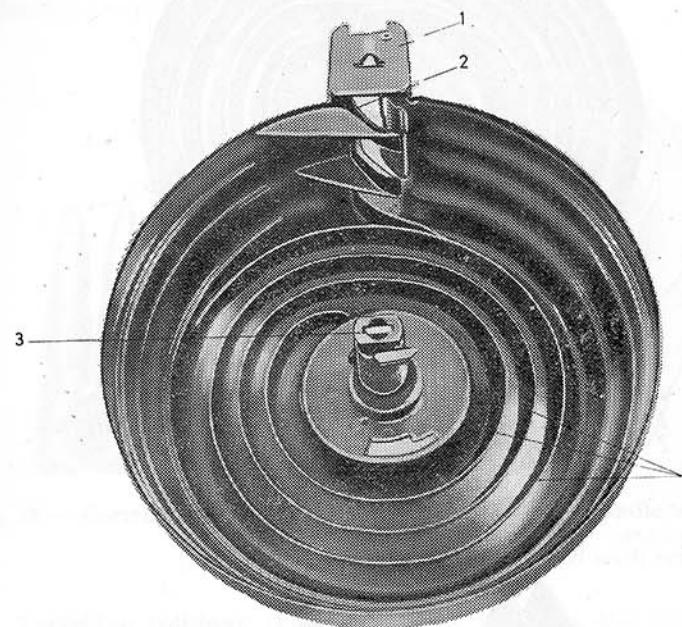


Fig. 22 — View and parts of the drum body

1 — cartridge mouthpiece, 2 — guide, 3 — spiral, 4 — feeder shaft

Cartridge guide leads cartridges into the cartridge mouthpiece. Spiral on the body together with another spiral on the cover serves for proper arrangement and guidance of cartridges toward the mouthpiece.

**Cover** (Fig. 23) closes the drum body. It is provided with spiral, feeder shaft hole, round checking hole and supporting lug for keeping the drum within the receiver opening.

**Feeder with spring** (Fig. 24) together with follower is used to pass the cartridges to the mouthpiece. It is provided with five profiled lugs, a hole for shaft and a pin for spring end.

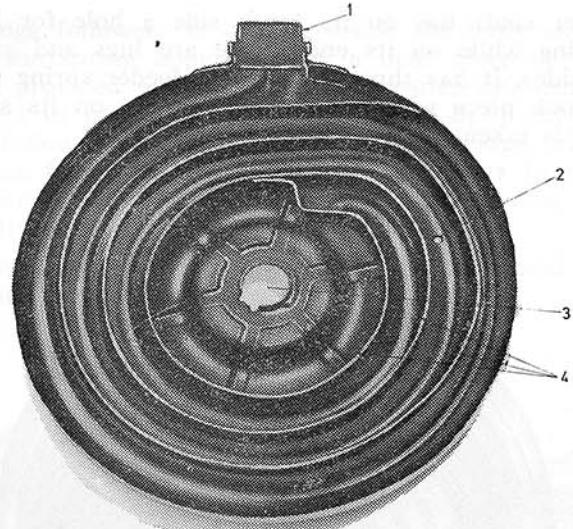


Fig. 23 — View and parts of the drum cover

1 — supporting lug,  
2 — checking hole,  
3 — feeder shaft hole,  
4 — spiral

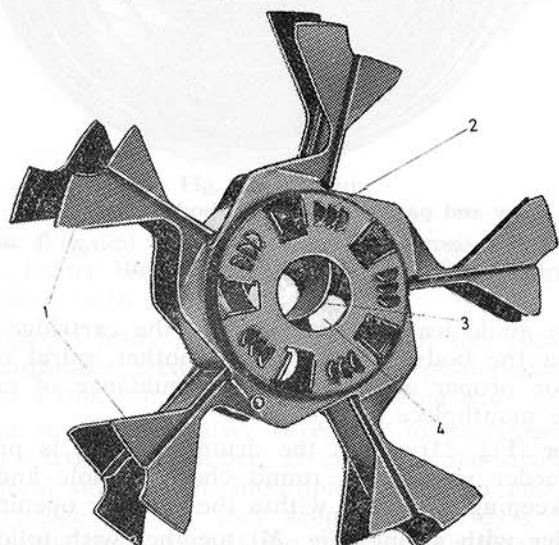


Fig. 24 — View and parts of the feeder with spring

1 — profiled lugs,  
2 — lugs,  
3 — feeder  
4 — hole for  
shaft

On its front side there are lugs which enable operation of the loading handle with pawl.

An arrow on the rear side indicates direction of rotation of the feeder in assembling the drum. The feeder spring has a catch for connection with the feeder shaft and a buckle for connection with the feeder pin.

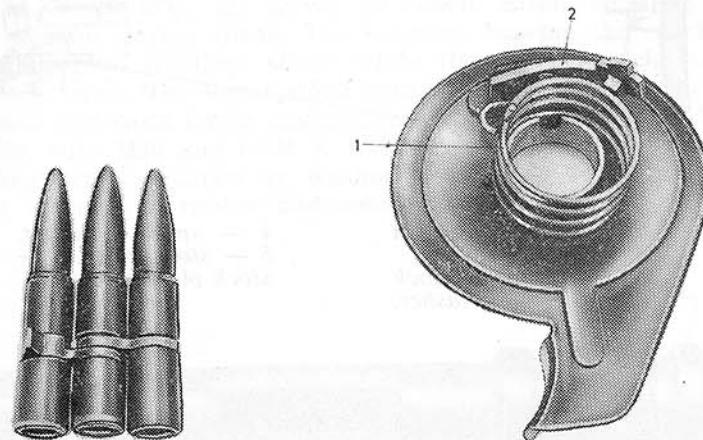


Fig. 25 — Cartridge follower

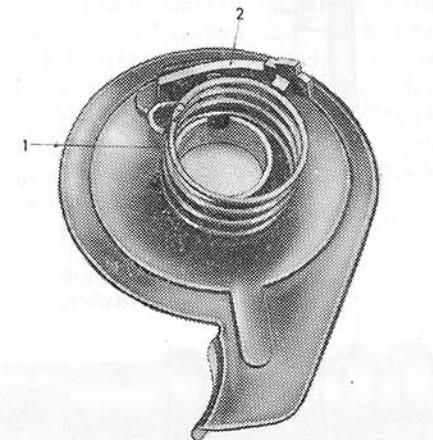


Fig. 26 — Loading handle with pawl  
1 — spring,  
2 — pawl with spring

**Cartridge follower** (Fig. 25) serves to bring the last round from the body to the mouthpiece. It consists of three dummy cartridges joined together by links. One of the links has a lug which stops movement of the follower to the mouthpiece after all the rounds have been fired.

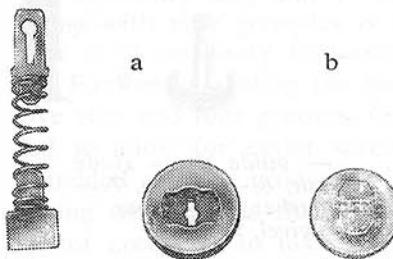
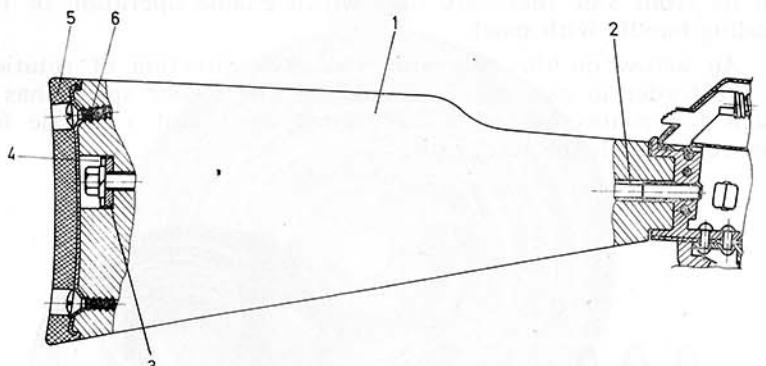
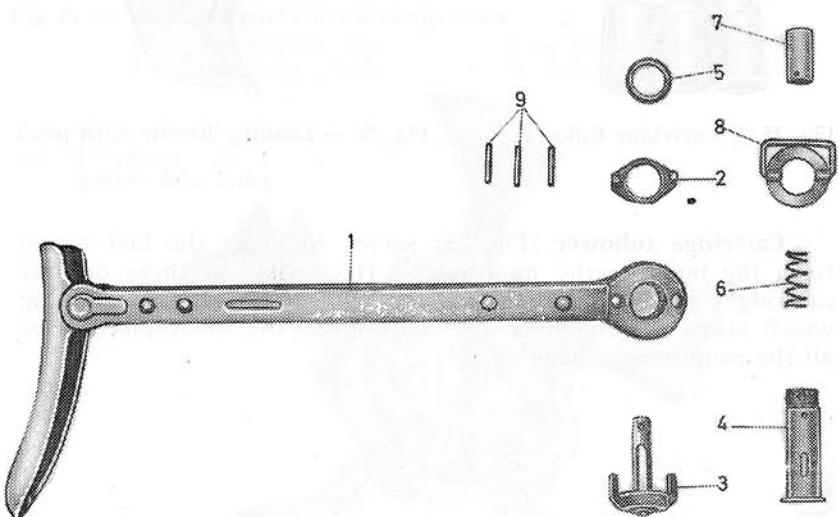


Fig. 27 — Lock piece with spring and clips



a) view and position  
of wooden stock  
1 — stock, 2 — stock  
screw, 3 — washer,

4 — spring washer,  
5 — stock plate, 6 —  
stock plate screw



b) parts of metal  
stock  
1 — folding stock, 2  
— left abutment, 3  
— right abutment, 4

— guide, 5 — guide  
nut, 6 — spring, 7 —  
pusher, 8 — rear  
swivel, 9 — pins

Fig. 28 — Stock

**Loading handle with pawl** (Fig. 26) serves to turn the feeder during loading of the drum. It has a lug with spring and a base for the pawl. The pawl and spring can be separated from the loading handle.

**Lock piece with spring and clips** (Fig. 27) serve to join together all parts of the drum.

**30. Stock** (Fig. 28) serves to enable easier handling with the weapon during firing. The weapons bearing the mark »A« have a metal (folding) stock, while the other models have a wooden stock. The metal stock consists of two levers, shoulder support and stock fixing mechanism with sling rear swivel. Stock of the rifle M70 and LGM is fixed to the receiver by a longitudinal screw secured by washer and spring washer. Stock plate is made of rubber and secured by two screws.

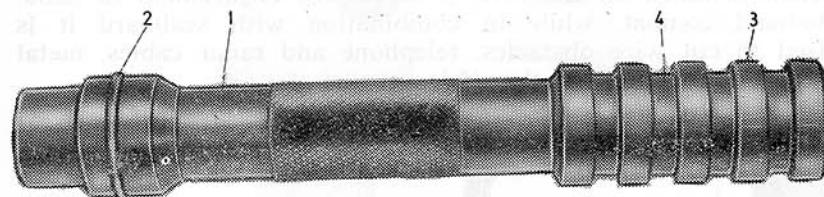


Fig. 29 — View and parts of the grenade launcher

1 — grenade launcher,                           3 — rib, 4 — groove  
2 — launcher spring,

**31. Grenade launcher** (Fig. 29) is used to hold the rifle grenade and to give it direction of flight. The launcher does not make a whole with the rifle; instead, it is carried separately in the accessory bag and is to be screwed onto the rifle when firing with rifle grenades is intended. In order to fit the launcher it is necessary to unscrew the compensator from the rifle. For better sealing the launcher front end is provided with five ribs and four grooves. Central part of the launcher is knurled to allow for easier screwing on/off while the rear part is provided with a groove which serves as a seat for launcher spring which holds the grenade in position on the launcher. It is not necessary to take off the launcher when firing with live ammunition.

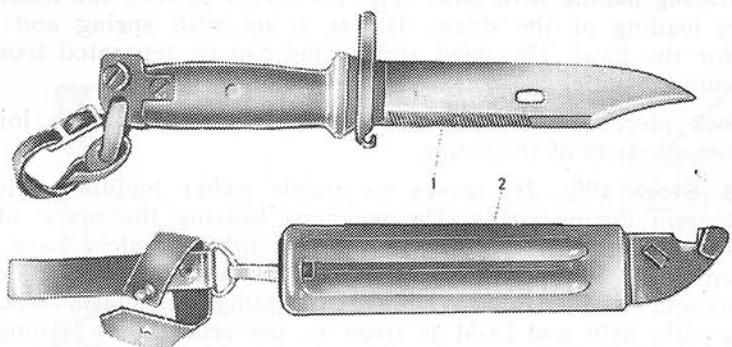


Fig. 30 — Knife-scissors

**32. Knife-scissors** (Fig. 30) consists of knife and scabbard. When installed on the rifle, it serves for engagement in hand-to-hand combat, while in combination with scabbard it is used to cut wire obstacles, telephone and radar cables, metal and wooden bars and other objects.

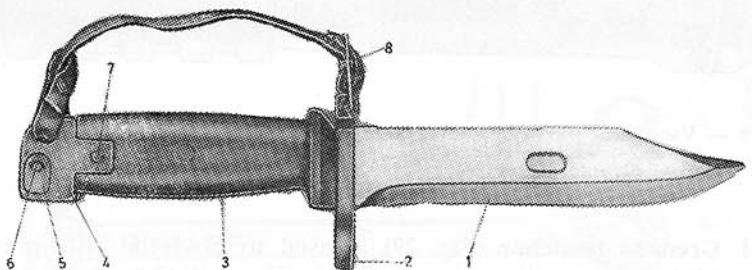


Fig. 30a — Knife

1 — blade, 2 — abutment, 3 — handle, 4 — knife catch body,

5 — catch, 6 — button, 7 — screw, 8 — cord buckle.

**Knife** (Fig. 30a) consists of knife blade, knife blade abutment, knife handle, knife catch body and cord buckle.

Knife blade has a hole through which the knife is joined with coupling on scabbard — thus forming **scissors for wire cutting** (Fig. 31). Bottom side of the blade has indentations and serves as a saw. Rear end is tail-shaped and serves for fastening of knife handle and knife catch body.

Knife blade abutment is fitted onto blade and secured by rivets. It fixes the knife to the rifle barrel.

Knife handle is fixed to the blade rear end and serves as an insulator during cutting of various wires — cables and for more comfortable handling with the knife.



Fig. 31 — Forming the scissors from knife and scabbard

Knife catch body is fixed to the rear part of handle by a screw. It contains the fixing mechanism consisting of catch, spring and button. The cord buckle passes through an oval hole on the knife catch body.

Cord buckle serves to support the hand when the knife is used as a saw. One end passes through the oval hole on the knife catch body while the other one is hooked onto a lug on the knife blade abutment.

**Scabbard** (2) is used to carry the knife while in combination with the blade it forms the scissors for wire cutting. It consists of scabbard, scabbard spring and scabbard buckle. The scabbard is made of plastics and serves as an insulator. On the front part there is the scabbard blade and blade fixing coupling while the rear part has the scabbard hook on it.

Scabbard spring is located inside the scabbard and secures the knife within the scabbard.

Scabbard buckle is used to carry the knife with scabbard. It is to be fixed onto the belt, while a buckle swivel fixes it to the scabbard hook.

33. **Bipod** (Fig. 32) serves as a front rest when firing with LMG. It consists of bipod legs holder, two legs with shoes, bipod legs axle, spring and bipod retaining spring, while on LMG M72AB1 there is also a collar with securing pin. The bipod of LMG M72AB1 can be removed from the barrel. Bipod legs holder or collar on LMG M72AB1 is fitted onto the barrel and secured by the front sight base.

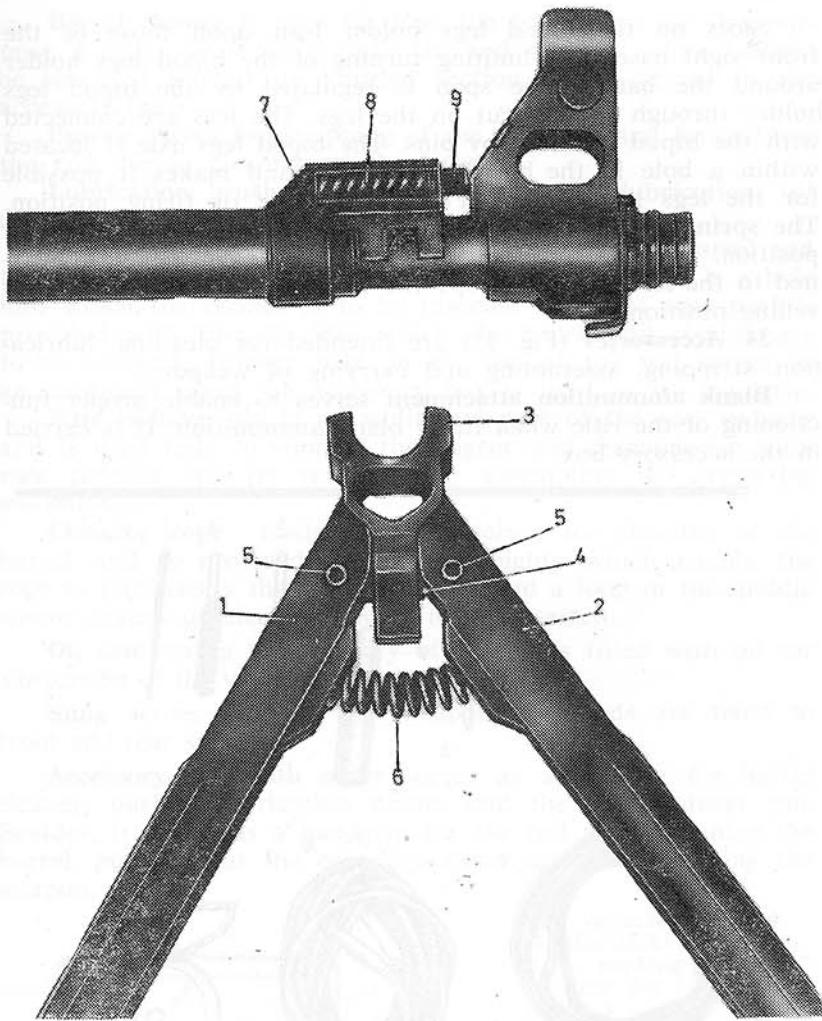
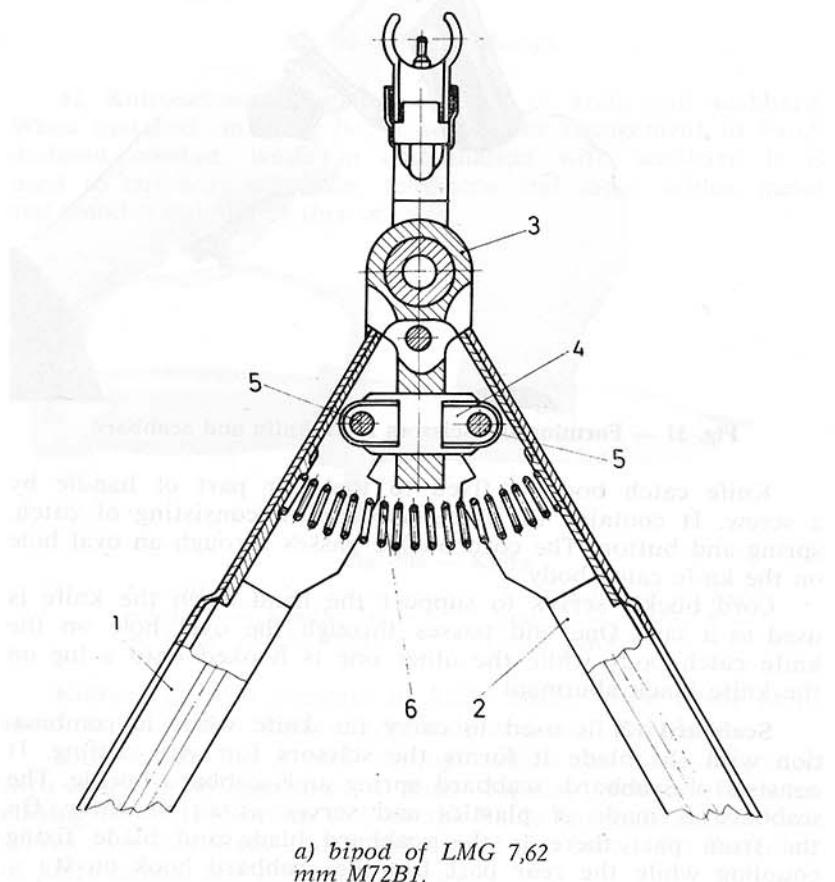


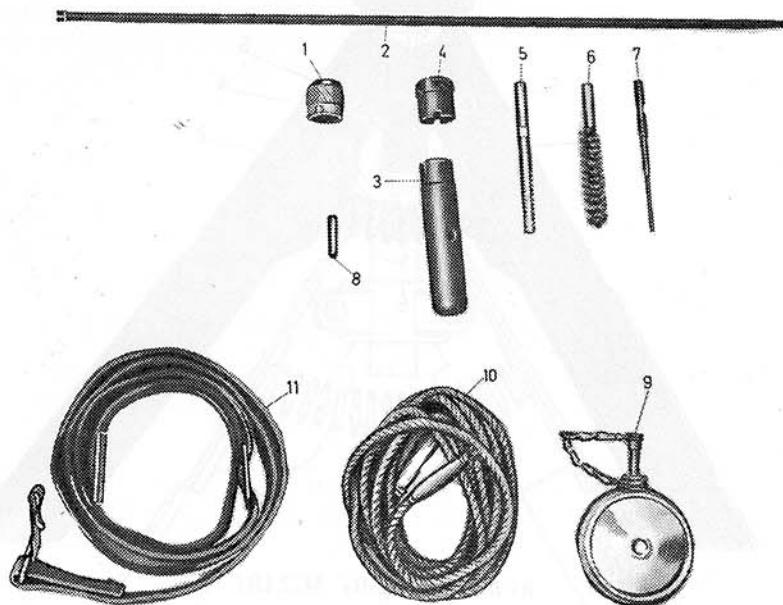
Fig. 32 — Bipod

- |                                                                                                                |                                                                            |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| 1 — left bipod leg,<br>2 — right bipod leg,<br>3 — bipod legs holder,<br>4 — bipod legs axle,<br>5 — pins, 6 — | bipod legs spring, 7 — collar, 8 — spring, securing pin, 9 — securing pin. |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|

Slots on the bipod legs holder lean upon those of the front sight base thus limiting turning of the bipod legs holder around the barrel. The span is regulated by the bipod legs holder through a slant cut on the legs. The legs are connected with the bipod legs axle by pins. The bipod legs axle is located within a hole in the bipod legs holder and makes it possible for the legs to be brought into travelling or firing position. The spring always tends to keep the legs with shoes in spread position. By a locking wire the bipod retaining spring is fastened to the left leg and keeps the legs pressed together in travelling position.

**34. Accessories** (Fig. 33) are intended for cleaning, lubrication, stripping, assembling and carrying of weapons.

**Blank ammunition attachment** serves to enable proper functioning of the rifle when firing blank ammunition. It is carried in the accessory box.



a) accessories of weapons  
1 — blank ammunition attachment, 2 — cleaning rod, 3 — accessory box, 4 — box cover, 5 — barrel cleaner, 6 — lubrication brush, 7 — pusher, 8 — rate reducer pin, 9 — oil can, 10 — barrel cleaning rope, 11 — sling

**Barrel cleaner** is used to clean the barrel and for this purpose it must be screwed onto the rod. Oakum or rag should be wrapped around its knurled section. It is carried in the accessory bag.

**Pusher** serves for stripping of the weapons and for holding the rod during cleaning of the barrel.

**Lubrication brush** serves for cleaning and lubrication of the barrel.

Cleaning rod is used to clean and lubricate the barrel and to push out jammed cartridge cases. On its top there is a hole into which the pusher is to be inserted while its rear part is provided with threads onto which the brush and cleaner are to be screwed. Thicker part on the top of the rod serves as an abutment when the accessory box is used as a handgrip.

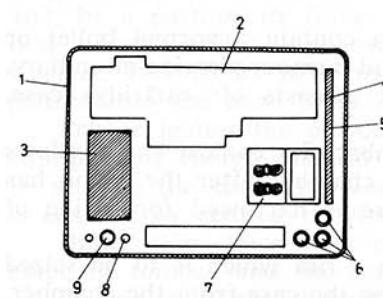
**Rate reducer pin** is an additional part of the rate reducer and is used only to connect the trigger and disconnector with rate reducer and its spring when assembling the triggering mechanism.

**Cleaning rope** made of hemp serves for cleaning of the barrel and is provided with lead weights which enable the rope to pass easily through the barrel and a loop in the middle where oakum or cleaning rag is to be inserted.

**Oil can** having the capacity of 30 cm<sup>3</sup> is filled with oil for lubrication of the weapons.

**Sling** serves to carry the weapons. Its ends are fixed to front and rear swivels.

**Accessory box with cover** serves as a housing for barrel cleaner, pusher, lubrication brush, and the rate reducer pin. Besides, it serves as a handgrip for the rod when cleaning the barrel, pushing out the cartridge cases or when stripping the weapon.



b) accessories for passive sight  
1 — packing case, 2 — seat for passive sight, 3 — bag, 4 — flannel cloth and brush in a bag, 5 — technical booklet for passive sight, 6 — NiCd batteries, 7 — battery charger with connecting cables, 8 — rectification wrench, 9 — screwdriver

Fig. 33 — Accessories

**Drum bag** is carried on the belt and it belongs to the light machine gun equipped with the drum.

**35. Accessory for passive sight** serves for maintenance and carrying of the sight.

**Packing case** for the passive sight is made of polyester and ensures complete sealing. Passive sight 5 × 80, spare parts, tools and accessories are placed in compartments made of polyurethane which allow for proper and soft seating thus enabling safe transport and storing of the device.

**Bag** is made of waterproof fabrics and is intended for carrying the passive sight with its mount in combat situations when the passive sight is not mounted on the weapon.

**Battery charger** serves for charging the empty batteries.

**Flannel cloth and brush** are placed in a plastic bag and are intended only for elimination of dirt from optical elements of the passive sight.

**Hexagonal wrench** is to be used for turning the screw for adjustment per elevation and traverse during rectification of the passive sight.

**Screwdriver** is intended for screwing on/off the screw on the passive sight mount.

### 3. PURPOSE, TYPES AND DESCRIPTION OF AMMUNITION

**36.** Automatic rifle and light machine gun use the following types of ammunition: ball, drill, blank and practice.

#### 1) CARTRIDGE 7,62 mm

**37. Ball cartridge** (Fig. 34) can contain a normal bullet or a special purpose one: tracing and armour-piercing-incendiary. Ball cartridge with normal bullet consists of: cartridge case, primer, powder charge and bullet.

**Cartridge case** is made of tombac. Its conical shape allows it to be easily extracted from the chamber after the round has been fired. Front part of the case is narrowed for fitting of the bullet.

Its rear part is provided with a rim which is to be seized by the extractor lug when extracting the case from the chamber. Cartridge case bottom serves as a seat for the primer and

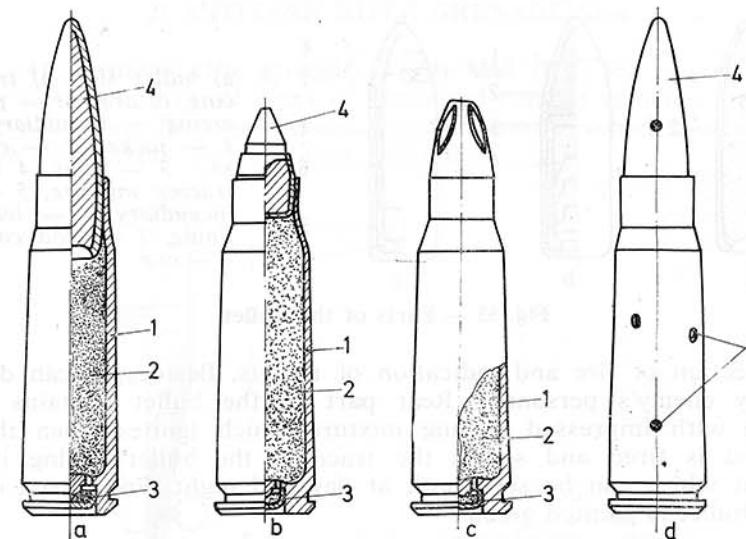


Fig. 34 — Parts of the ball cartridge with bullet M67

- a) ball cartridge, b) drill cartridge M76,
  - c) blank cartridge M68, d) practice cartridge
- 1 — cartridge case, 2 — powder charge, 3 — primer, 4 — bullet,  
5 — holes

has two holes through which flame passes from the primer to powder charge. The bottom is equipped with an anvil in shape of a smaller protrusion (boss) against which the priming charge is squeezed and ignited.

**Powder charge** is used to create adequate pressure within the case by combustion, to give initial velocity to the bullet and, by a part of its force to return the bolt into rear position, which enables semi-automatic/automatic operation of the weapon. It consists of nitro-cellulose powder (NC-08) loosely poured into the case. Mass of the charge is about 1,6 g.

**Primer** ignites the powder charge. It consists of a metal cup, priming charge and foil disc. The primer is impressed into its seat on the cartridge case bottom and sealing of the joint is ensured by coating it with a corresponding lacquer.

**Bullet** (Fig. 35) consists of jacket and core. The jacket is made of tombac and the core is made of lead-antimony alloy.

During its flight through the air at ranges up to 800 m, the tracing bullet leaves an illuminating trace which allows for

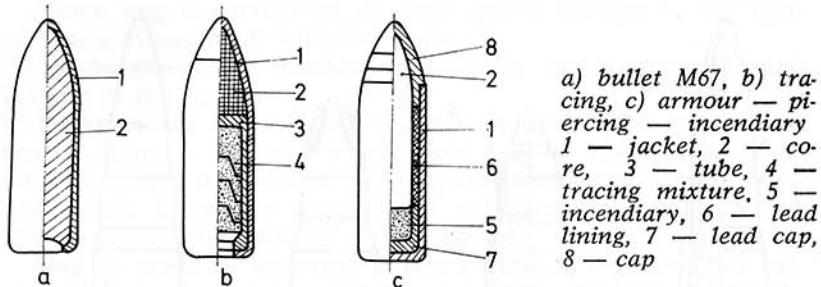


Fig. 35 — Parts of the bullet

correction of fire and indication of targets. Besides, it can destroy enemy's personnel. Rear part of the bullet contains a tube with impressed tracing mixture which ignites when the round is fired and shows the trace of the bullet during its flight which can be seen both at day and night. Front part of the bullet is painted green.

Armour-piercing-incendiary bullet is intended for ignition of inflammable liquids and destruction of personnel behind light shelters at ranges up to 300 m. When the bullet hits an obstacle the incendiary mixture ignites and sets fire to inflammable material. Front part of the bullet is painted black with a red ring.

**38. Drill cartridge M76** (Fig. 34b) is intended for firing at ranges up to 100 m. Up to this range, the bullet of the drill cartridge has the same ballistic characteristics as the bullet of the ball cartridge M67. Maximum range of this bullet is 600 m.

**39. Blank cartridge M68** (Fig. 34c) is intended for firing at exercises and salvo. It is bulletless, its nose bent and protected from moisture penetration. Cartridge case is longer than with ball cartridge by about 10 mm to allow for bending of the narrowed part. Sealing mass on the top of the case ensures hermetization. Powder charge consists of nitro-cellulose powder (NC—01).

**Safe distance when firing with blank ammunition 7,62 mm is 20 m.** At smaller distances soldiers may be hurt.

**40. Practice cartridge** (Fig. 34d) is intended for training in loading/unloading of the weapon. It consists of cartridge case and bullet jacket. The case is filled with plastic mass. The case and bullet jacket are provided with holes to distinguish it from a ball cartridge.

## 2) ANTITANK RIFLE GRENADE M60

**41. Antitank rifle grenade (TKM) M60** (Fig. 36) is intended for destruction of all types of armoured combat vehicles. It can be also used for destruction of other motor vehicles, demolition of bunkers and fortified buildings.

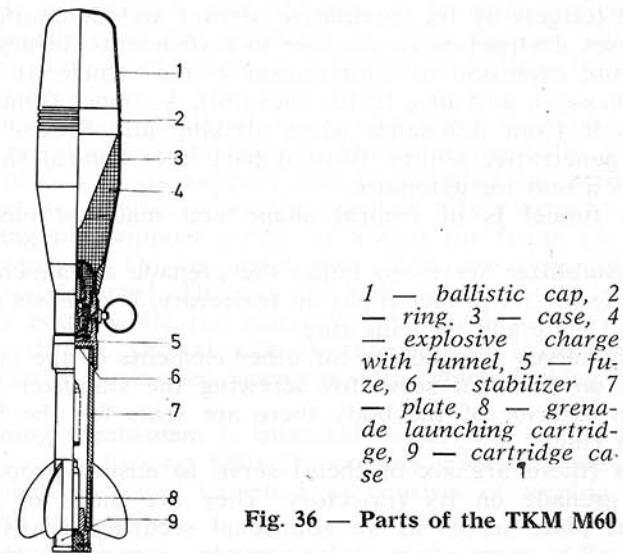


Fig. 36 — Parts of the TKM M60

Antitank rifle grenade pierces a steel plate 200 mm thick at the angle of 90°. The grenade is effective when it strikes the obstacle at an angle of 25° and greater.

**42. Antitank rifle** grenade consists of the following main component parts: ballistic cap with ring, grenade case, explosive charge with funnel, fuze, stabilizer and grenade launching cartridge with case.

**43.** Thanks to its aerodynamic shape the ballistic cap enables proper flight of the grenade and when striking the target it ensures the optimum distance of the focus of cumulative stream from the front surface of the obstacle (target).

It is connected to the case through the ring by circular bending. External rim of the ring is provided with circular grooves and ribs by means of which the cap is connected with the case.

**44. Grenade case** contains the explosive charge with funnel and joins together all the parts of the grenade. On its bottom there is a thread for connection with the fuze. Interior of the case, in contact with the explosive charge, is coated with lacquer thus achieving firm contact between the explosive charge and the case. Caliber of the case is 60 mm.

**45. Explosive charge with funnel** at explosion penetrates the obstacle (target) by its cumulative stream and detonation wave and causes destruction or damage to instruments, injury to personnel and explosion of ammunition in the vehicle. It is made of 60% hexogen and 40% trotile (hexatol). A copper funnel lining protects it from damaging when striking an obstacle and increases penetrative ability. Bottom part is of conical shape and serves as a seat for detonator.

The funnel is of conical shape and made of electrolytic copper.

**46. Stabilizer** serves to guide the grenade at launching and to provide for its proper flight on trajectory. It consists of body, fins, steel plate and securing ring.

**Body** serves as a holder for other elements of the stabilizer. Threads on its front serve for screwing the stabilizer into the fuze. On exterior of the body there are seats for the fins and securing ring.

**Fins** (there are six of them) serve to ensure proper flight of the grenade on its trajectory. They are made of plastics.

**Steel plate** serves as an additional securing means to prevent possible penetration of hot powder gases toward the explosive charge.

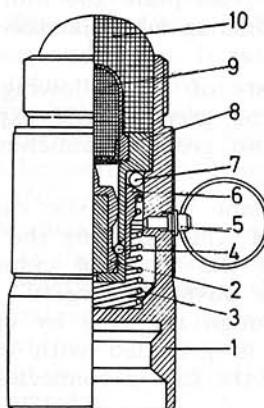


Fig. 37 — Parts of the fuze DI M60

**Securing ring** serves as a support for the fins and prevent them from falling off the stabilizer body.

**47. Fuze DI M60** (base, impact-inertial type) is of instantaneous action and serves to set off the explosive charge when the grenade hits an obstacle (target). It consists of (Fig. 37): body, firing pin, firing pin support, arming mechanism, safety mechanism, detonator primer, detonator and transport safety.

**Body** is provided with threads on its ends for connection with grenade case and stabilizer. It joins together all parts of the fuze. Transport safety is screwed on a thread cut on its lateral side.

**Firing pin** is made of brass and filled with lead. In transport position it is blocked by three locking balls. The firing pin is placed in its support and is intended for activation of the detonator primer when the grenade hits a target.

**Firing pin support** serves as a seat for firing pin and detonator primer. On its upper part there are two threads: external and internal. Through its external thread it is fixed to the fuze body, while the detonator primer is screwed onto the internal thread. Lateral side of the support is provided with three slantly positioned openings into which locking balls are inserted.

**Arming mechanism** is intended for arming of the fuze and together with locking balls it provides necessary safety when the grenade is being launched. It consists of arming ring, arming ball and spring.

**Safety mechanism** ensures safety of the grenade during transport and storing. It consists of transport safety and locking balls. Transport safety prevents arming of the fuze since in assembled position it locks the arming ring and prevents its displacement. **The transport safety must be taken off (by screwing off ) before firing.**

**Detonator primer** is intended for activation of the detonator. Its front part is placed in a seat on the detonator. Rear part of the primer is provided with a thread for screwing the primer into the firing pin support. Under the primer within a corresponding seat in the support there is a tin foil which prevents activation of the grenade during its flight being used as a rest for the firing pin.

**Detonator** is used to set off the explosive charge. It is made of hexogen retarded by 5% montan wax. Its front part is of conical shape to provide for uniform activation of the explosive charge.

**48. Grenade launching cartridge** provides the grenade with required muzzle velocity. It consists of (Fig. 38) cartridge case, primer and powder charge. The cartridge case and primer are the same as with the b'ball ammunition. Top of the case is closed by radial squeezing and sealed by adequate sealing mass. Joint between the primer and case is coated with varnish to provide sealing. Mass of the powder charge is 2,33 g.

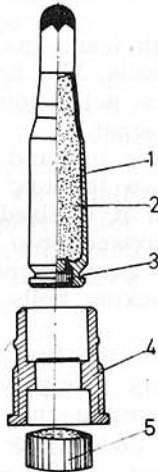


Fig. 38 — Parts of grenade launching cartridge

Case for the cartridge is made of plastics and it holds the cartridge within the grenade stabilizer during transport and storing. The cartridge is to be taken out of the case before loading the rifle.

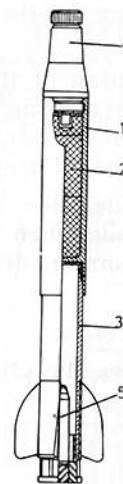
This cartridge is unified for all types of live and practice rifle grenades.

### 3) ANTIPERSONNEL RIFLE GRENADE M60 AND M60P1

**49. Antipersonnel rifle grenade (TTM) M60 and M60 P1** is intended for destruction and neutralization of personnel and firearms not protected by armour.

The grenade fragments are effective within a diameter of 100 m.

**50. Antipersonnel grenade M60** (with fuze UTI M60) and **M60P1** (with fuze UTI M70P1) (Fig. 39) consists of grenade case, explosive charge, stabilizer, fuze and grenade launching cartridge with its case.



1 — case, 2 — explosive charge, 3 — stabilizer, 4 — fuze, 5 — grenade launching cartridge

Fig. 39 — Parts of the TTM M60

**51. Grenade case** serves to house and join together all parts of the grenade. It is of cylindrical shape and made of steel. Threads on the front end serve for the fuze while those on the rear end serve for the stabilizer. The body contains explosive charge which at explosion breaks the case into a great number of fragments. Its caliber is 30 mm.

**52. Explosive charge** is made of hexogen retarded by 5% montan wax. It consists of three cylindrical discs. The first one is shorter and has a seat into which the detonator primer partially fits so that it serves as a detonator intensifier.

**53. Stabilizer** has four fins and its description is given under item 46.

**54. Fuze UTI M60** (Fig. 40) is of impact, instantaneous-inertia action and it causes burst of the explosive charge when the grenade hits the target. It is safe up to 4 m in front of the muzzle. It is permanently screwed onto the grenade. **Before firing it is necessary to take off the fuze cap.** The fuze is very sensitive and it reacts even at water impact.

The fuze consists of body, cap, impact mechanism, arming and safety mechanism, primer, intensifier and detonator.

**Body** joins together all parts of the fuze. Its shape forms the front conical part of the grenade. Its front is provided with threads for screwing the cap on while the threads on the rear end serve for screwing the fuze into the grenade case and for screwing the detonator.

**Cap** serves as a transport safety. Sealing of the cap and fuze is achieved by a rubber gasket.

**Impact mechanism** is intended for activation of the primer. It comprises the following component parts: firing pin with its support, firing pin spring, lock, primer carrier, rest for primer carrier, primer support guide and tapered ring.

**Arming and safety mechanism** is intended for arming of the fuze and for providing safety of the grenade when it is being launched. It consists of arming ring with spring, arming ball, primer carrier abutment and locking ball.

**Primer** activates the intensifier by its flame.

**Intensifier and detonator** serve to transfer the effect of the primer to the explosive charge.

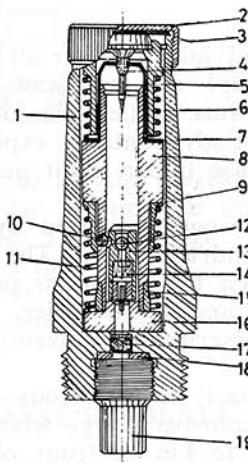


Fig. 40 — Parts of the fuze UTI M60

1 — body, 2 — cap, 3 — sealing, 4 — firing pin, 5 — firing pin support, 6 — firing ring spring, 7 — abutment, 8 — guide, 9 — arming ring, 10 — arming ball, 11 — arming spring, 12 — locking ball, 13 — primer carrier, 14 — primer, 15 — tapered ring, 16 — rest for primer carrier, 17 — intensifier, 18 — ring, 19 — detonator

55. **Fuze UT M70P1** (Fig. 41) is of impact, instantaneous action. It belongs to the group of fully safe fuzes. This fuze is fitted to the antipersonnel rifle grenade M60P1 and it is the only design difference from the grenade M60.

The fuze consists of the following parts: body, cap, firing mechanism, safety mechanism and detonator with transfer explosive charge.

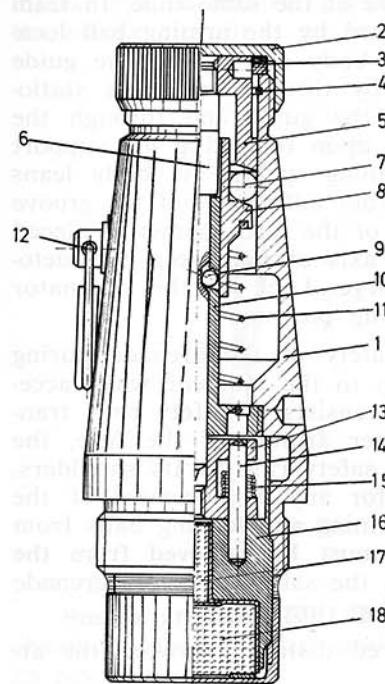


Fig. 41 — Parts of the fuze  
UT M70P1

**Body** joins together all parts of the fuze. Its top is provided with threads onto which the cap is screwed while on its lateral side there is a threaded hole into which the transport safety is screwed. On its bottom there are external threads for screwing of the fuze into the grenade case while the threads on internal side serve for screwing the detonator support with transfer explosive charge.

**Cap** is screwed onto fuze top and protects it from impact during transport. The cap must be taken off before firing. Sealing of the cap and body is achieved by a rubber gasket.

**Firing mechanism** is intended for activation of the detonator. It consists of the following parts: firing pin, firing pin support, primer with carrier, pin and spring, arming ring with

spring, arming ball, guide and lock of the detonator support with spring. Firing pin is screwed into the support making one unit with it and by its whole length passes through the complete fuze body. Down, the top of the firing pin enters the primer carrier thus locking the fuze at the same time. In transport position the firing pin is fixed by the arming ball located in grooves on the firing pin, body and guide. The guide is connected with the fuze body by threads and it is stationary. Arming ring is fitted onto the guide and through the locking ball one of its ends leans upon the firing pin support and the other rests upon the arming spring. Its body leans against the arming ball, keeps it from falling out of the groove thus preventing premature arming of the fuze. Primer is placed in its carrier and located off the axis of firing pin and detonator with transfer explosive charge. Lock of the detonator support fixes the support in arming position.

**Safety mechanism** ensures safety of the grenade during transport and on its trajectory up to the moment when acceleration of the grenade ceases. It consists of safety ring, transport safety and locking ball. After arming of the fuze, the firing pin support leans upon the safety ring by its shoulders. Transport safety does not allow for any displacement of the arming ring thus preventing the arming and locking balls from falling out. **The transport safety must be removed from the fuze before firing.** Sealing between the safety ring and grenade case is achieved by a rubber sealing ring.

Locking ball allows for required distance between the arming ring and firing pin support.

**Detonator with transfer explosive charge** is placed inside the detonator support which is screwed into the fuze body. It serves to receive the detonation wave and to transfer it to the explosive charge.

#### 4) SMOKE RIFLE GRENADE M62

**56. Smoke rifle grenade (TDM)** is used to make smoke curtains, to put enemy's observation posts and fire positions out of action, to give signals and to indicate targets, to deceive enemy in regards to targets and direction of fire and to mask own units. At short distances smoke curtains can be made throwing the grenade by hand.

Burning time of the grenade is 80—90 seconds. Width of the smoke curtain depends upon weather conditions (wind speed, barometric pressure and the like), height of the smoke curtain depends upon thermic streams of air. At the wind speed of 3 m/sec and barometric pressure below 1000 milibar, width of the smoke curtain is up to 1000 m and its height up to 8 m.

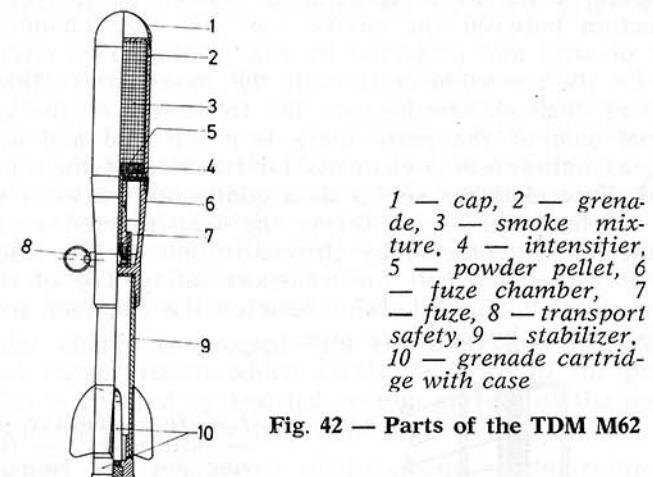


Fig. 42 — Parts of the TDM M62

**Smoke grenade** (Fig. 42) consists of cap, smoke box, fuze chamber, fuze, stabilizer and grenade launching cartridge with its case.

**57. Cap** closes the grenade from above and gives it aerodynamic shape. It is fitted onto the grenade case and connected to it by circular bending.

**58. Smoke box** contains the smoke mixture. It consists of case, smoke mixture with flame intensifier, powder pellet and grate.

**Case** of the smoke box is in fact the grenade case. It is protected by chromatization. Its front side is provided with a seat and groove for connection with the cap. Underside of the case has a seat for the grate. Inside the case (between its wall and smoke mixture) there is a cardboard cylinder which acts as an insulator to prevent burning of the case. Caliber of the case is 40 mm.

**Smoke mixture** creates the smoke curtain by combustion. It is made on the basis of calcium silicide. On its lower part

there is a layer of thermite mixture which serves as a flame intensifier and in the middle there is a powder pellet made of black powder.

**Powder pellet** is made of black powder and is used to accept flame of the fuze retarder, to set off flame intensifier and to exert necessary pressure to separate the smoke box from the fuze chamber.

**Grate** serves as a regulator of smoke intensity and as a connection between the smoke box and fuze chamber. It is made of steel and protected by zinc plating. Two circular grooves on its rim connect it with the case. Smoke intensity is regulated through openings on the front side of the grate. On internal side of the grate there is a felt pad and a celuloid lining as indispensable elements for function of the smoke box.

**59. Fuze chamber** serves as a connection between the body and stabilizer. Its shape forms the rear tapered part of the grenade. It is protected by chromatization. On its lateral side there is a threaded hole for transport safety. Top of the chamber is closed by the lid. Joint between the chamber and smoke box is stucked by adhesive tape.

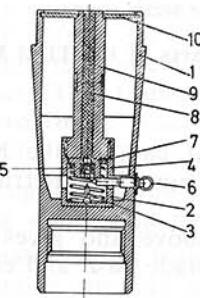


Fig. 43 — Parts of the fuze DI M62

**60. Fuze DI M62** (Fig. 43) is of base, inertia type with pyrotechnic retarder. It includes body, firing pin, primer carrier with spring and primer retarder and transport safety.

**Body** joins together all parts of the fuze and serves also as a retarder holder. Front of the body is provided with a thread into which the retarder is screwed. A seat for the firing pin is provided on the bottom side. On the lateral side there is a threaded hole for transport safety. The body is protected by chromatization.

**Firing pin** fires the primer when striking upon it. It is made of brass and fixed to the body by centre punching.

**Primer carrier** rests by its circular rim upon the spring on one side and upon the retarder body on another. In transport position it is locked by the transport safety so that it cannot move. **Spring** serves as an elastic support and lock of the primer carrier and secures against action of the primer carrier if the grenade accidentally falls from a small height after its transport safety has been removed. It is made of wire.

**Primer** sets fire to the retarder by its flame after activation.

**Retarder** sets fire to the powder pellet some time after its ignition. It consists of body and powder charge. Bottom of the body is provided with threads for screwing into the fuze body. Through its center along the longitudinal axis there is a hole into which the powder charge is pressed. A cap is screwed onto the front narrowed part. Before screwing the cap onto the body the threads are coated with shellac to provide better sealing and to prevent penetration of primer flame, i.e., to prevent premature ignition of the powder pellet.

**Powder charge** is pressed into the body and it produces a directed flame stream which surely sets fire to the powder pellet. This is ensured by knurled bottom surface of the powder charge. Burning time of the fuze is 7,5 sec.

**Transport safety** prevents displacement of the primer carrier during transport and storing of grenades. It includes body, sealing and ring. **The transport safety must be taken off before firing.**

**61. Stabilizer** of the grenade is described under item 46.

## 5) ILLUMINATING RIFLE GRENADE M62

**62. Illuminating rifle grenade (TOM) M62** serves to illuminate the field for observation of the enemy, to discover and indicate the targets, to observe results of firing, to correct fire and to annoy the enemy. In addition to this, the grenade may be also used to mark attained positions or direction of own attacking units, to give certain signals, and, exceptionally, to set fire to easily inflammable materials.

The grenade illuminates the ground in diameter of about 300 m for approximately 30 seconds. Illuminating torch with parachute falls down at the speed of about 3 m/sec.

**63. Illuminating grenade** (Fig. 44) consists of the following component parts: cap, grenade case, fuze chamber, illuminating torch, ejection charge, parachute with liners, fuze, stabilizer and grenade launching cartridge with its case.

**64. Cap** is described under item 57. It contains a part of the parachute. For better sealing the joint of the ballistic cap and grenade case is wrapped by adhesive tape which also ensures required strength of the joint. It is not necessary to take off the tape before firing.

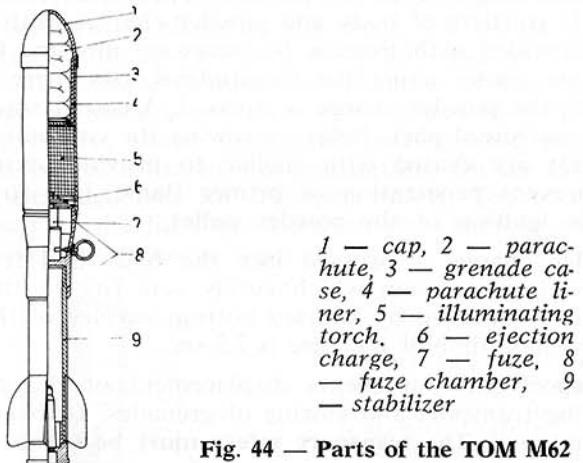


Fig. 44 — Parts of the TOM M62

**65. Grenade case** serves as a housing for all parts of the grenade and for illuminating torch, parachute with liners and ejection charge. It is protected by chromatization. On its front there is a seat for connection with the cap while its rear end is connected to the fuze chamber by circular bending. Its caliber is 40 mm.

**66. Fuze chamber** serves as a holder for stabilizer and transport safety; it connects the grenade case with the stabili-

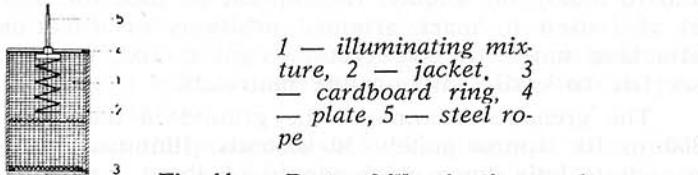


Fig. 44a — Parts of illuminating torch

zer and contains the fuze. Its shape forms the rear ogival part of the grenade. It is protected by chromatization. On its front end there is a seat for connection with the grenade case, while its rear end is provided with threads for stabilizer. On its lateral side there is a threaded hole for transport safety.

**67. Illuminating torch** (Fig. 44a) serves as a light source. It includes jacket, illuminating mixture, cardboard ring, steel rope and plate.

**Jacket** of the torch is made of steel sheet and protected by phosphate plating and lacquering. It contains the illuminating torch and serves as a holder for all parts of the torch.

**Illuminating mixture** is made on the basis of magnesium. It is pressed into the jacket in two layers.

**Cardboard ring** is used to cover the illuminating torch and to protect circumferential layers of the face surface. The ring ensures setting fire to initiating mixture pressed into top side of the illuminating torch.

**Steel rope** serves as a connection between the parachute and illuminating torch. It is made of twisted wire and protected by zinc plating.

**Plate** prevents penetration of the torch flame during setting fire to and ejection of the torch from the grenade case.

**68. Ejection charge** serves to set fire to the illuminating torch, to separate the grenade during flight and to eject the illuminating torch with parachute. It is made of black powder and placed into a linen bag.

**69. Parachute** serves for dropping of the illuminating torch. It consists of canopy and harness. The canopy is made of terylene and the harness of silk thread. When the parachute is activated a hole in the top of canopy absorbs the impact created by air resistance and mitigates swinging of the parachute during its falling. The parachute is placed between two metal liners.

**The liners** hold the parachute and protect it from burning at ejection of the illuminating torch.

**70. Fuze DI M62** is described under item 60, the only difference being that burning time is slightly shorter and that retarder sets fire to the ejection charge.

**71. Stabilizer and grenade cartridge** are the same as with antipersonnel rifle grenade (item 53 and 48).

## 6) PRACTICE ANTITANK RIFLE GRENADE

72. Practice antitank rifle grenade VTKM M68 is intended for training in handling and firing. The grenade does not contain explosive charge and fuze.

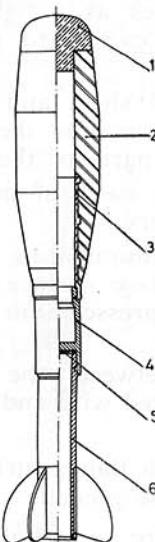


Fig. 45 — Parts of the VTKM M68

73. The grenade consists of the following parts (Fig. 45): rubber cap, head, head support, coupling, stabilizer with plate and grenade cartridge.

**Rubber cap** by its shape provides for aerodynamic shape of the grenade. Its rear end is provided with a lug for connection with the head. The cap absorbs impact of the grenade on target, prevents damage to the grenade and lengthens its life.

**Head** is made of plastic mass and made in one piece. On its front there is a hole for the lug of the cap, while its rear side ends with the support. Head support is made of aluminum alloy and has three rings which make the joint between the head and support firm. Rear end of the support is provided with threads into which the coupling is screwed.

**Coupling** serves as a connection between the head and stabilizer. Its front end is provided with threads for connection with the head support and rear end with threads for stabilizer. **Stabilizer with plate and grenade cartridge** are the same as with live grenades.

74. The practice grenade may be used to fire at tanks and other armoured vehicle. Depending upon amount of damage the same grenade may be used several times.

After each firing of the grenade it is necessary to do the following:

- screw off the stabilizer and wipe its threads by a cloth dipped into a lubricant;
- clean interior of the stabilizer (by soft wood and cloth);
- screw the stabilizer onto the grenade body; this is to be done in vertical position taking care to retain the plate in its seat; it is not allowed to apply force to fit a filthy stabilizer onto the grenade launcher, and
- before each new firing it is necessary to check whether the stabilizer has been fully screwed onto the coupling. If it cannot be completely screwed on, it should be replaced by a new one (only in case of breakage or large deformation of the fins). When changing the stabilizer it is necessary to replace the plate too.

When firing with practice grenades, care should be taken to remove the personnel from direction of firing and immediate vicinity. The same safety measures should be taken as when firing with live grenades.

## 7) PRACTICE ANTIPERSONNEL RIFLE GRENADE

75. Practice antipersonnel rifle grenade (VTTM) M66 is intended for training in handling and firing.

76. The grenade consists of the following parts (Fig. 46): fuze, grenade case, stabilizer with plate and grenade cartridge.

**Fuze** (Fig. 46a) is of inertia, instantaneous action type and is used to indicate drop of the grenade. It includes body, firing pin, spring and marker. Fuze body serves as a housing for all parts of the fuze, firing pin is screwed into it. Opening of the body is provided with threads into which the firing pin is screwed. On the bottom of the body, there is a hole through which smoke of the marker goes out. Underside of the body is provided with threads for connection with the grenade case. Marker indicates drop of the grenade by smoke and noise. It consists of body, primer, smoke mixture and cardboard cover. For protection of the primer and smoke mixture from moisture the primer is coated with shellack before impressing, and the cardboard cover is coated with nitrolacquer. Spring keeps the mar-

ker at a specified distance from the firing pin, provides for required safety in handling and prevents premature activation of the grenade during its flight. The firing pin activates the marker primer.

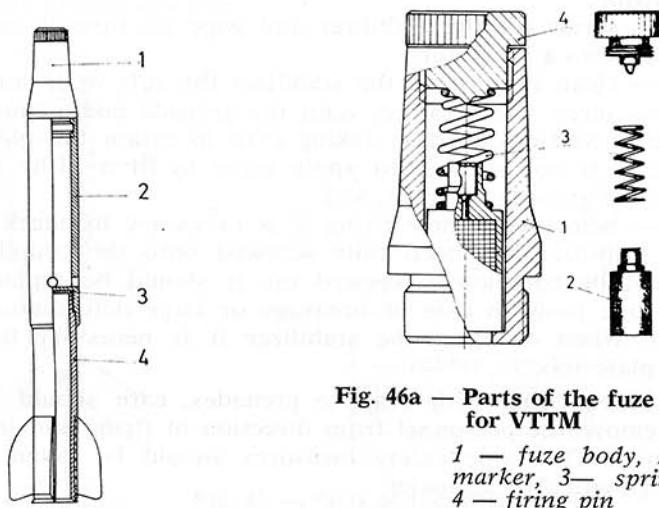


Fig. 46a — Parts of the fuze for VTTM

1 — fuze body, 2 — marker, 3 — spring, 4 — firing pin

Fig. 46 — Parts of the VTTM M66

1 — fuze, 2 — grenade case, 3 — plate, 4 — stabilizer

**Grenade case** is cylindrical, with external sizes identical to those of the live grenade case and it joins together all parts of the grenade. Its lateral sides are provided with 4 symmetrically positioned openings through which smoke goes out. Its front part is provided with threads into which the fuze is screwed, while the threads on its rear part serve for stabilizer screwing on.

**Stabilizer with plate and grenade cartridge** are the same as with live grenades.

77. When firing with the grenade it is necessary to observe the rules set out under item 74 including the following steps too:

— unscrew the firing pin, take out the spring and marker body, then unscrew the fuze body, clean the marker seat and interior of the case with openings, and

— screw the fuze body, into the grenade case, place the marker and spring into the body and screw the firing pin on.

The adequate range will be reached if a previously used marker is used again for firing, but the impact will not be indicated by smoke and noise.

#### 4. STRIPPING AND ASSEMBLING OF WEAPONS

78. Weapons are to be stripped for the purpose of cleaning, lubrication, inspection and replacement of defective parts.

**Before stripping it is necessary to check if the weapon is empty.** It is not allowed to apply force in stripping and assembling. Stripped parts should be laid aside not mixing them with parts of other weapons. Stripping in barracks should be made on a table, bench or the like, while for field stripping a rag or blanket should be used.

79. To check whether the weapon is empty and to unload it proceed as follows:

**Separate the magazine:** take stock of the rifle by the left hand and magazine by the right hand, press the magazine catch to the magazine, pull the magazine out of its seat and lay it aside (Fig. 47).

**Take handguard** of the LMG by the right hand, separate bipod legs from bipod retaining spring by the left hand and place the light machine gun upon bipod, take stock by the left hand and raise it while gripping the magazine (drum) by the right hand placing the right hand thumb upon the magazine (drum) catch; press the catch toward the magazine (drum) and take it out.

**Take bolt carrier** handle by the right hand thumb and index finger and pull it abruptly backward thus ejecting the cartridge or cartridge case out of the cartridge chamber. By visual inspection make sure that the cartridge chamber is empty and slowly release the bolt into front position.

If the magazine contains ammunition, after having checked if the weapon is unloaded, lay it aside and empty the magazine.

During unloading the weapon must not be pointed at the personnel or buildings which may be damaged by the bullet.

80. Before unloading the weapons with folding stock, it is necessary to extend the stock, take handgrip of the weapon by the right hand, press upon the pusher by the thumb and extend the stock by the left hand.

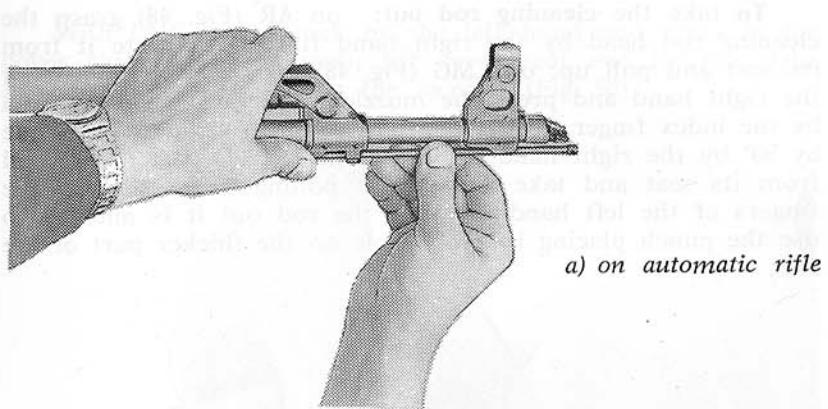
81. When stripping the weapon in the unit it is allowed to do the following: take the cleaning rod out, separate the receiver, take out and disassemble the recoil mechanism, take out the bolt carrier with piston and separate the bolt from its carrier, separate the gas cylinder, separate the lower handguard and take off the muzzle protecting ring. In case of LMG M72AB1 separate the bipod too.



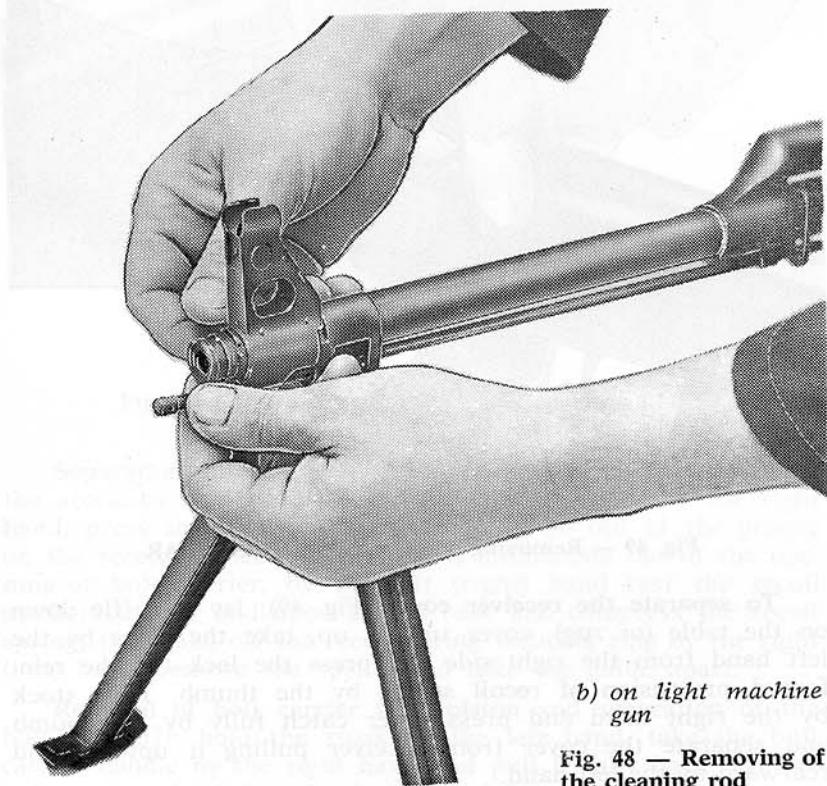
Fig. 47 — Removing of the magazine

Further stripping and assembling may be done only by experts.

82. The weapon should be stripped by the following sequence: take the accessory box with cover out of the bag, remove the cover from it, take out the accessories and lay aside;



a) on automatic rifle



b) on light machine gun

Fig. 48 — Removing of the cleaning rod

**To take the cleaning rod out:** on AR (Fig. 48) grasp the cleaning rod head by the right hand fingers, separate it from its seat and pull up; on LMG (Fig. 48) take the front sight by the right hand and press the muzzle protecting ring fixing pin by the index finger, then turn the cleaning rod abutment aside by 90° by the right hand; separate the thicker part of the rod from its seat and take the rod out pulling it forward by the fingers of the left hand. To take the rod out it is allowed to use the punch placing it into a hole on the thicker part of the rod;



Fig. 49 — Removing of the receiver cover on AR

**To separate the receiver cover** (Fig. 49): lay the rifle down on the table (or rug), cover turned up, take the cover by the left hand from the right side and press the lock for the reinforced protrusion of recoil spring by the thumb. Take stock by the right hand and press cover catch fully by the thumb and separate the cover from receiver pulling it upward and rearward by the left hand.

With LMG, take stock by the left hand and press in the cover catch by the thumb; lift cover rear end by the right hand and separate it from the receiver (Fig. 50).



**Fig. 50 — Removing of the receiver cover on LMG**

**Separation and stripping of recoil mechanism** (Fig. 51): hold the stock by the left hand, grip the cover catch by the right hand, press in to make the cover catch go out of the groove on the receiver, then pull the recoil mechanism out of the opening on bolt carrier, by the left (right) hand rest the recoil mechanism rear end upon a firm base and compress the recoil spring; then take off the recoil spring securing ring by the right (left) hand, remove the spring and take the guide apart.

**Removal of bolt carrier with piston** and separation of the bolt (Fig. 52): hold the stock by the left hand, take the bolt carrier handle by the right hand and pull it fully back, lift the bolt carrier with bolt and take it out of the receiver.



Fig. 51 — Separation of the recoil mechanism



Fig. 52 — Removal of the bolt carrier with piston and bolt

To separate the bolt from its carrier (Fig. 53) take the bolt carrier into the left hand with bolt turned up. Pull the bolt rearward and turn it to the right by the right hand so that the profiled bolt guiding lug goes out of the profiled groove of the carrier and pull the bolt forward to release it;

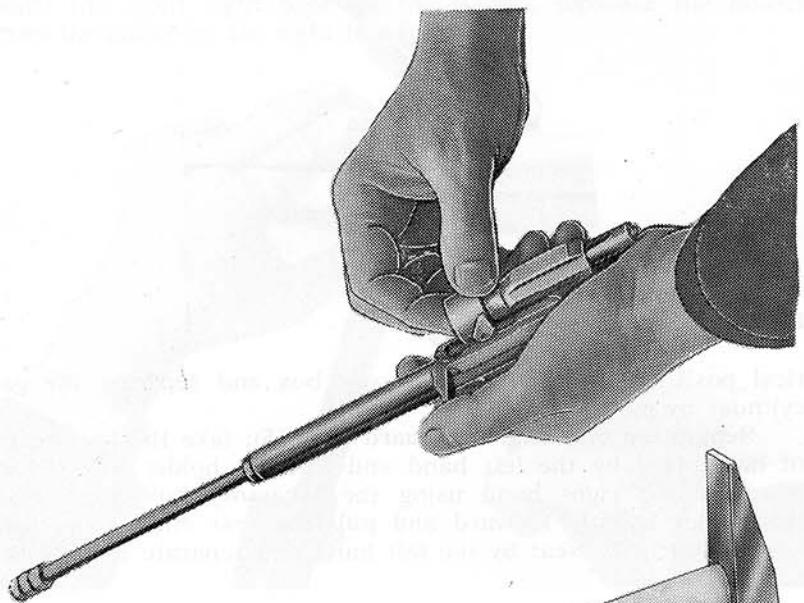


Fig. 53 —  
Separation of the bolt body  
from the bolt carrier

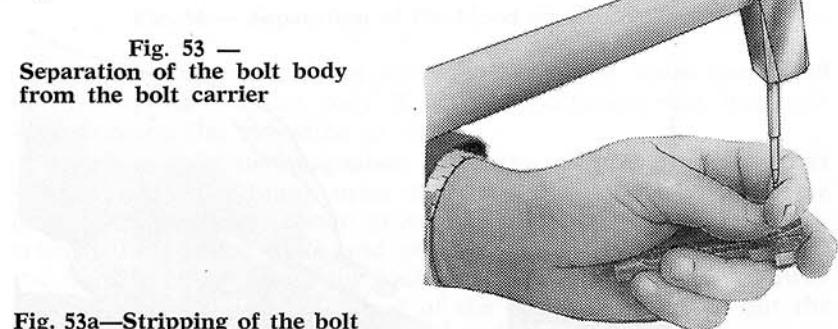


Fig. 53a—Stripping of the bolt

**Stripping of bolt body** (Fig. 53a): Using the punch drive out the firing pin securing pin and extractor shaft, and then separate the firing pin, extractor and extractor spring from the bolt body.

**Separation of gas cylinder** (Fig. 54): by the left hand hold the rifle by the receiver and LMG by the handguard. Lift the grenade launching sight on AR. Take the accessory box and fit by its slot upon the bent part of wing lock and lift it into ver-

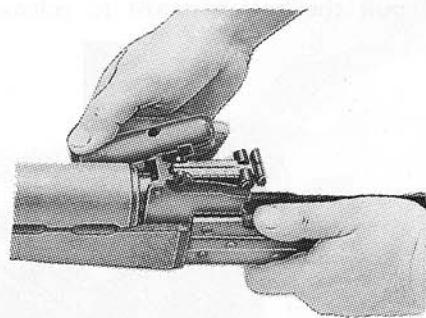


Fig. 54 — Separation of the gas cylinder

tical position, remove the accessory box and separate the gas cylinder by pulling upward.

**Separation of lower handguard** (Fig. 55): take the lower part of handguard by the left hand and turn its holder by 180° upward by the right hand using the accessory box, then push the holder slightly forward and pull the rear end of the handguard out of its seat by the left hand and separate it from the barrel.

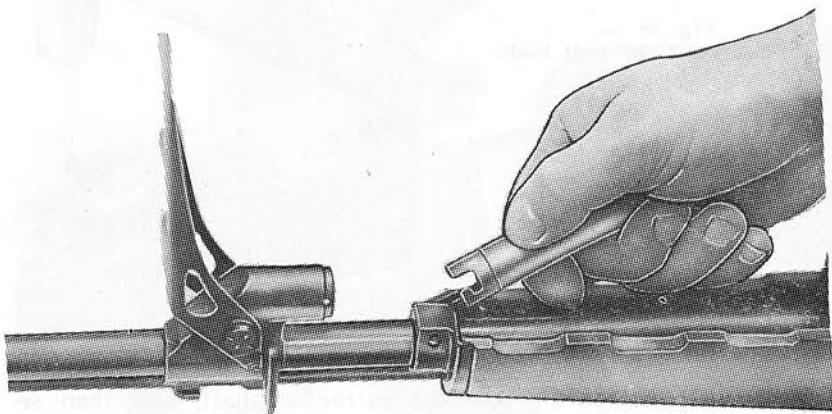


Fig. 55 — Separation of the lower handguard

**Separation of muzzle protecting ring (compensator)**; by the index finger of the left hand press fully the protecting ring securing pin, then screw off the protecting ring to the right.

**Separation of the bipod on LMG M72AB1** (Fig. 56): take the front sight by the left hand pushing the bipod legs holder toward the front sight base by the thumb, separate the holder from the collar by the right hand.

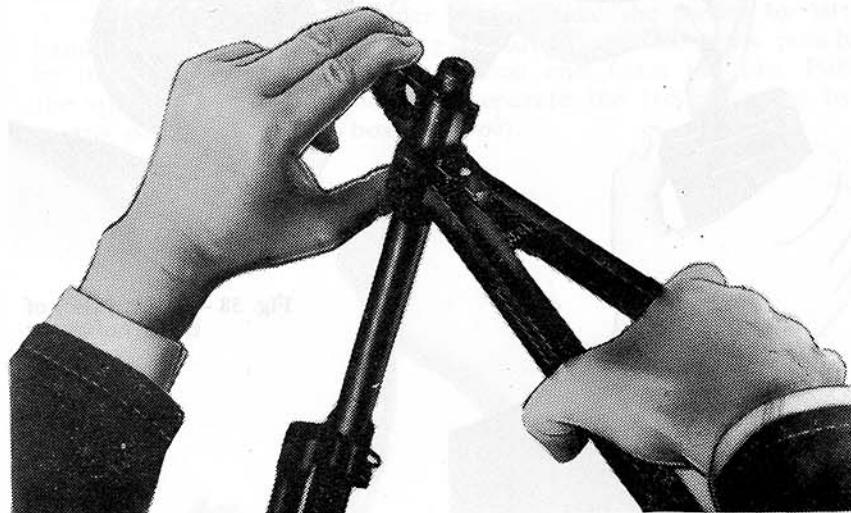


Fig. 56 — Separation of the bipod on LMG M72AB1

83. Magazine and drum are to be stripped upon command of the superior officer only if dirt or corrosion has been observed inside the magazine or drum.

**Stripping of the magazine:** take the magazine by the left hand placing the thumb upon the narrow part of the magazine (Fig. 57); using the punch press the bottom plate lock piece, release the bottom plate and pull it forward by the fingers of the right hand retaining the lock piece with spring and follower by the left hand. Upon removal of the bottom plate take out the spring and cartridge follower and put the parts aside.

**Stripping of the drum:**

— **separation of drum cover:** lay the drum by its bottom down on the table. Using the punch by the right hand press the cover lock piece. By the left hand turn the clip by 1/4 turn

and remove it from the feeder shaft. Retaining the mouthpiece by the thumbs of both hands take off the cover by other fingers,



Fig. 57 — Stripping of the magazine

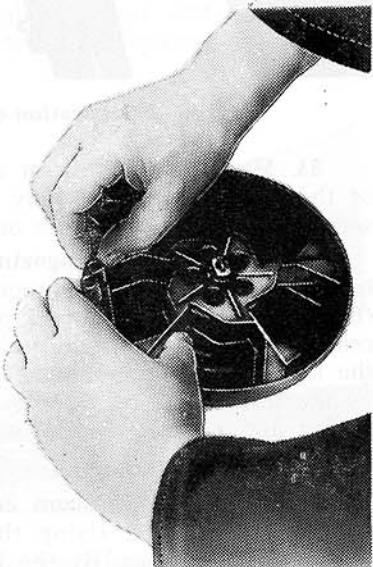


Fig. 58 — Separation of the drum cover

Fig. 59 — Separation of the feeder

— separation of feeder: take the drum by the left hand retaining one of the feeder lugs by the thumb and holding the mouthpiece by other fingers. By the thumb of the left hand turn the feeder slightly clockwise and pull the feeder out of the mouthpiece by the right hand (Fig. 59). Holding the drum body by the left hand, turn the feeder anticlockwise uniformly by the right hand, release the spring and remove the feeder from the shaft,

— separation of the feeder spring: take the feeder by left hand so that the pin for spring is turned up. Using the punch by the right hand remove the spring end from the pin. Pull the spring slightly out and then separate the feeder spring by means of the accessory box (Fig. 60),



Fig. 60 — Separation of the feeder spring

— separation of drum handle: lay the drum down on the table with the handle up. Press the lock piece in by the punch. By the left hand turn the clip by  $1/4$  turn and pull it upward out. While retaining the drum body by the left hand, lift the

handle (Fig. 61) by the right hand and uniformly releasing the spring separate it from the body. Take the lock piece with spring out of the feeder shaft hole.



Fig. 61 — Separation of the drum handle

84. When the rear night sight is fitted on the light machine gun it is to be removed by lifting it from the leaf by the fingers (thumb and index finger) and pulling off.

85. If the rifle is equipped with the knife it should be turned muzzle up and holding it by the left hand press the knife catch (Fig. 62). By the right hand pull the knife up and take it off.

86. **Assembling of the weapon** is to be performed by the opposite sequence observing the following instructions:

— the cleaning rod is to be placed last. When inserting the rod its thicker part must enter the seat on the lower part of the front sight base,

— before placing the gas cylinder it is necessary to lift its lock, place the gas cylinder into its position and turn the lock

downward by 90° by means of the accessory box so that the boss on the lock falls into a circular slot on the rear sight base,

— when the bolt is assembled take the bolt carrier with bolt into the right hand and insert the piston into the opening of the rear sight base, then gently push forward so that the receiver guides enter the grooves of the bolt carrier,

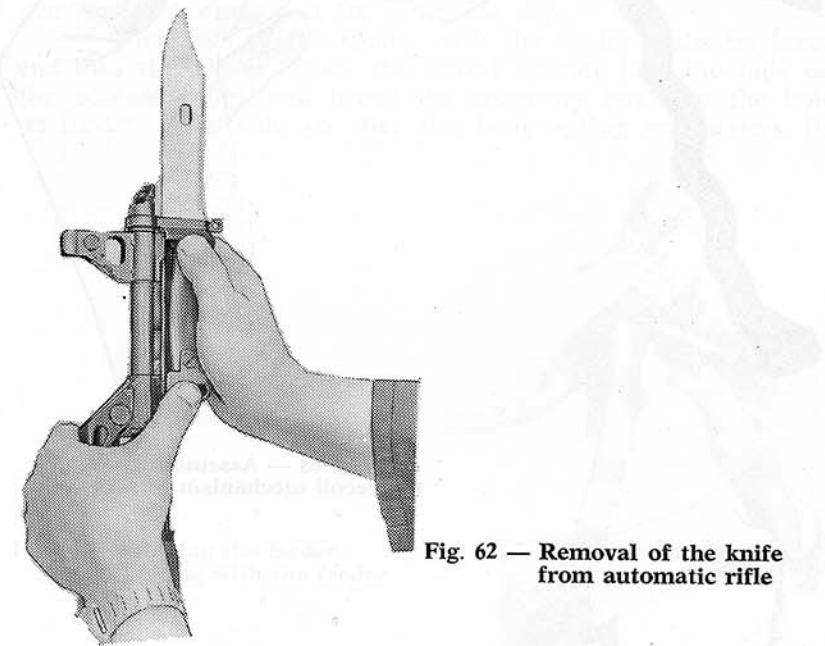


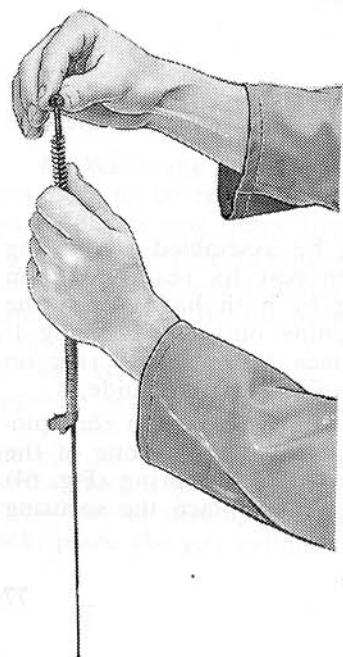
Fig. 62 — Removal of the knife from automatic rifle

— recoil mechanism of AR is to be assembled by placing the recoil spring upon its guide, then rest its rear end upon a firm base and compress the spring by both hands onto the rear guide while pulling the front guide out and bringing it into cross position (Fig. 63), then place the securing ring on bent arms of the front guide and extend the front guide,

— to assemble the recoil mechanism of LMG join the spindle with the guide, then insert the rod into the opening of the spindle and resting it upon a firm base fit the spring (Fig. 64) compressing it by the left hand and finally place the securing ring by the right hand,



**Fig. 63 — Assembling of the recoil mechanism of AR**

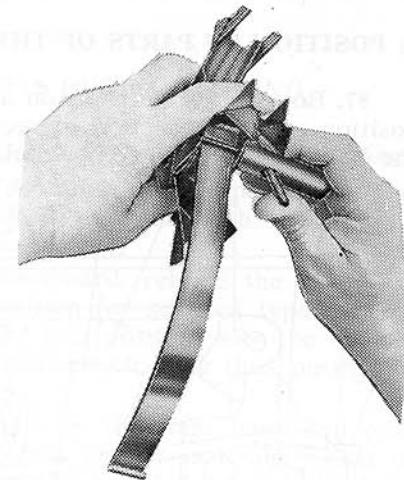


**Fig. 64 — Assembling of the recoil mechanism of LMG**

— when inserting the magazine it is necessary to tilt it forward a little and then pull it rearward so that the magazine catch engages with the magazine lug,

— when fitting the handle onto the drum place the lock piece with the spring into the feeder shaft hole and insert the handle spring end into the opening on the body bottom. Pressing the handle to the body bottom turn it anticlockwise, overcoming the spring resistance to make the pusher fall into the slot on the bottom and fix it by the clip,

— when joining the spring with the feeder place its inner end into the feeder. Place the barrel cleaner into the hole on the accessory box and insert the accessory box into the hole on feeder front side so that the bent spring end enters its



**Fig. 65 — Joining the feeder spring with the feeder**

square slot (Fig. 65). Turning the accessory box clockwise by means of the barrel cleaner insert the spring into the feeder until its outer end is engaged with the lock piece,

— when placing the feeder into mouthpiece turn the feeder clockwise by 1—1.5 turn and while retaining it in this position insert the feeder and then release it,

— when placing the rear night sight on LMG, illuminating spots should be turned backward, then press from above by both thumbs and fit the sight onto the leaf,

— to fit the bipod onto the barrel of LMG 7,62 mm M72AB1 (see Fig. 56) it is necessary to take the front sight base by the

fingers of the left hand and pull the collar to the base by the thumb of the same hand, put the bipod legs together by the right hand and lean the bipod legs holder against the barrel and rear part of the front sight base, release the thumb of the left hand to let the collar return into previous position under the action of its own spring and connect with the bipod legs holder,

— put the bipod legs together by the left hand and fold them toward the barrel and fix them by the retaining spring, and,

— after assembling pull the trigger.

## 5. OPERATION OF PARTS OF THE WEAPON

### 1) POSITION OF PARTS OF THE WEAPON BEFORE LOADING

87. Bolt carrier with piston and bolt body is in the foremost position under the action of recoil spring. Semi-circular lug on the bolt fits into the semi-circular groove in the receiver. Since

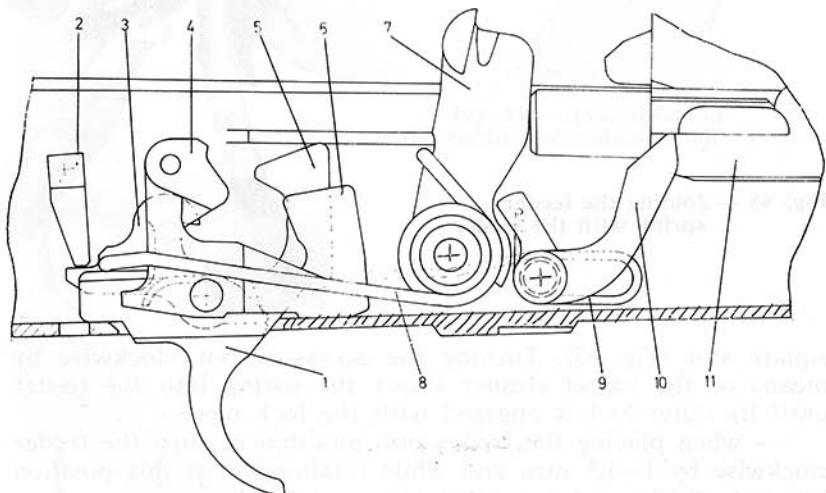


Fig. 66 — Position of triggering mechanism parts after triggering and with fire selector in safety position (»U«)

1 — trigger, 2 — fire selector, 3 — disconnector, 4 — rate reducer, 5 — trigger sear, 6 — rate redu-

cer body, 7 — hammer, 8 — hammer spring, 9 — full automatic sear spring, 10 — full automatic sear, 11 — bolt carrier

the bolt is turned to the right, the square lug by its rear face leans upon cut part on the left front side of the receiver. Firing pin is pressed by the hammer and its top protrudes out of the opening.

Hammer is free from engagement with the trigger and rate reducer catch and forced by the hammer spring, it presses the firing pin. Rate reducer catch is under the full automatic sear lug. Full automatic sear lever is in the front position and pressed downward (Fig. 66). Fire selector is brought into position »U« — safe. In this position the lug on lower part of the fire selector body leans upon the rear disconnector lug and does not allow the trigger to be pulled into rear position.

Grenade launching sight (on AR) is in horizontal position and the gas port is open.

### 2) OPERATION OF PARTS DURING LOADING

88. To load the weapon it is necessary to do the following:

— insert a full magazine (drum) into the opening on the receiver so that magazine catch is engaged with the lug on longitudinal rib of the magazine (drum);

— press the fire selector downward, release the safety of the weapon and bring it into position for selected type of fire. When the fire selector is brought into position »R« the lug on its body leans against the rear disconnector lug thus putting it out of action;

— take the bolt carrier handle by the right hand and pull it into rear position. While the bolt carrier is being pulled it acts by its profiled groove upon the profiled lug on the bolt body turning it to the left. Semi-circular and square lugs on the bolt body go out of their grooves on the receiver and the bolt is unlocked. Travelling further backward the bolt carrier by its rear face pushes the hammer which rotates around the axle compressing the hammer spring. Cocking lug on the hammer gradually comes under the tapered lug of trigger and rate reducer catch and the hammer is cocked. Simultaneously with turning of the hammer, under action of the spring turns also the full automatic sear lever whose top comes in front of the lug on the bolt carrier while its body leans by its lug upon the hammer lug. As soon as the bottom surface of the bolt carrier passes the magazine opening, rounds are being lifted by

the action of the spring and follower until the top round leans against the magazine lips. In its travel backward, the bolt compresses the recoil spring;

— when the bolt carrier handle is released, it starts moving forward by the action of recoil spring, the bolt grips a round from the magazine by the pusher and feeds it into the cartridge chamber. Under action of the inclination of longitudinal groove on the left side of the receiver, the square lug on the bolt body and by means of the profiled groove and lug, the bolt turns around its longitudinal axis to the right; due to this the semi-circular lug falls into the semi-circular groove and is locked. In this position, the extractor grips the cartridge case rim, and

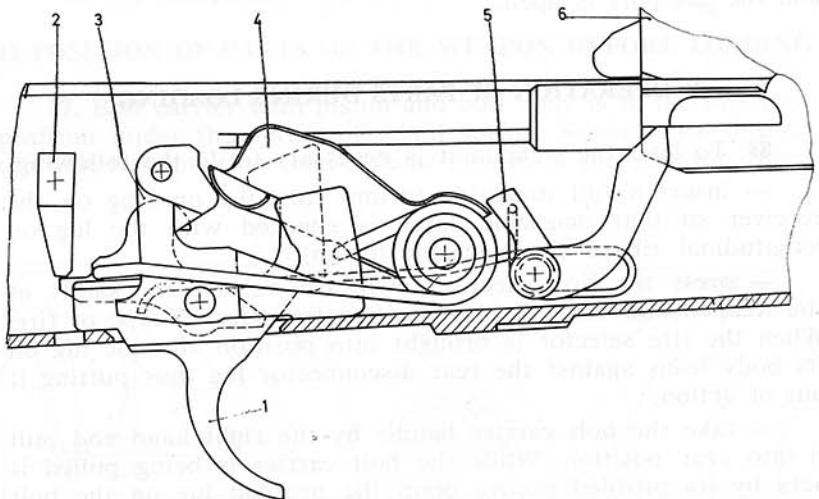


Fig. 67 — Position of triggering mechanism parts before firing, with fire selector on automatic fire position (»R«)

1 — trigger, 2 — fire selector, 3 — rate reducer, 4 — hammer, 5 — full automatic sear, 6 — bolt carrier

— continuing its advance movement, the bolt carrier by its lug pushes the full automatic sear lever forward and downward thus separating the full automatic sear lug from the hammer. Under the action of hammer spring the hammer turns but remains cocked being held by the tapered lug of the trigger (Fig. 67).

This completes loading of the weapon, cocking and locking of the bolt and now it is possible to commence fire.

### 3) OPERATION OF PARTS WHEN COMMENCING 'BURST' FIRE

89. To commence burst fire it is necessary to bring the fire selector into position »R« — burst fire; operation of the parts is as follows:

— when the trigger is pulled backward its tapered lug is separated from the hammer lug. Under the action of hammer spring the hammer turns around its axle and strikes upon the firing pin which then strikes by its top upon the primer. Initiating charge of the primer begins to burn and its flame passes through the holes on cartridge case bottom and sets fire to the powder charge,

— bullet moves through the barrel being forced by the powder gases. As soon as the bullet passes the gas port, a part of the powder gases enters the gas chamber and acts upon the piston face pushing the piston with bolt carrier backward. Carried by its carrier the bolt moves backward and becomes unlocked in the same manner as when the bolt carrier is pulled by hand. During this the bolt carrier compresses the recoil spring and the extractor pulls the cartridge case until it strikes by its bottom against the ejector which ejects it,

— triggering mechanism is cocked as described under item 88,

— when the bolt carrier with bolt returns into front position, the hammer is being retained only by the full automatic sear body. When the bolt has fed the cartridge into the cartridge chamber and upon completion of locking the bolt carrier continues to move forward and separates the full automatic sear body from the hammer. Being under the action of the hammer spring, the hammer turns and strikes against the rate reducer which results in reduction of fire and return of the barrel into initial position thus improving accuracy of firing. Burst fire will last as long as the finger is held on the trigger or there are rounds in the magazine, and

— to cease fire it is necessary to release the trigger, which turns under the action of hammer spring while its tapered lug stops movement of the cocking lug on the hammer. The hammer remains cocked and fire is ceased but the weapon remains ready to commence burst fire.

#### 4) OPERATION OF PARTS WHEN COMMENCING SINGLE FIRE

90. To commence single fire it is necessary to bring the fire selector into position »J« — single fire; operation of the parts is as follows:

— when the trigger is pulled backward, its tapered lug is separated from the cocking lug on the hammer. Under the action of hammer spring the hammer starts moving forward and strikes against the firing pin. After the first firing operation of the parts and mechanisms is the same as in burst fire (item 89), but there will be no subsequent firing since the disconnector has turned forward together with the trigger and the disconnector lug stops movement of the cocking lug on the hammer which remains in rear position (Fig. 68);

— to fire the next round it is necessary to release the trigger which turns rearward together with the disconnector under

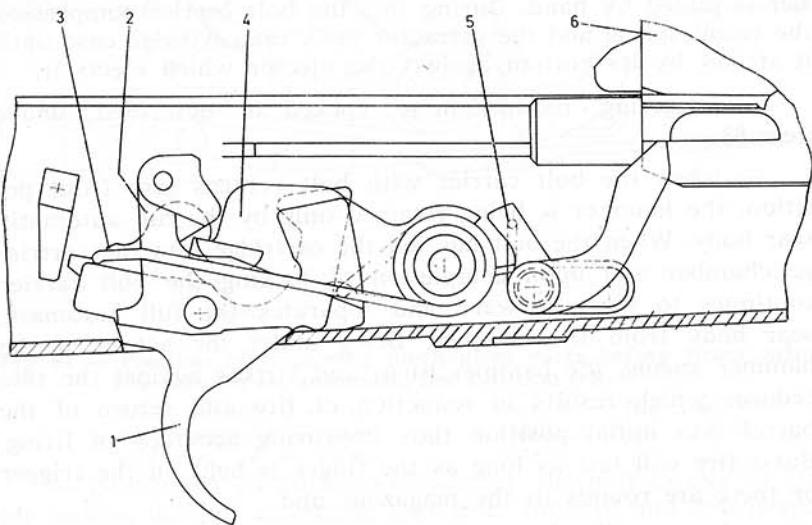


Fig. 68 — Position of triggering mechanism parts before firing, with fire selector on single fire position (»J«)

1 — trigger, 2 — rate  
reducer, 3 — discon-  
nector, 4 — hammer,

5 — full automatic  
sear, 6 — bolt carrier

the action of hammer spring. Disconnector lug is disengaged from the hammer lug. The hammer remains in cocked position held by the tapered lug of the trigger, and;

— when the trigger is pulled again operation of the parts of mechanisms is repeated and the next round is fired.

#### 5) FIRE COMMENCE WITH RIFLE GRENADES AND ARMING OF THE FUZE

91. When firing with rifle grenades operation of the parts is as given under item 90, the only difference being that it is necessary to lift the grenade launching sight from horizontal into vertical position in order to close the gas port so that the bolt is not unlocked through the chamber. Recoil of the rifle is more powerful. After ejection of the cartridge case the rifle is ready again for action.

92. After firing an antitank rifle grenade (TKM) with built-in fuze DI M60, powder gases force the grenade forward. Due to inertia the arming ring starts moving backward compressing the arming spring thus allowing the arming balls to fall out into widened part of the fuze body. When the inertia action stops and when the grenade has left the grenade launcher the arming spring returns the arming ring into the foremost position allowing the locking balls to fall out thus completing arming of the fuze. Process of complete arming of the fuze is finished when the grenade after having left the grenade launcher has passed the distance of 30 cm. After this distance the grenade will explode if it hits an obstacle.

Upon arming of the fuze due to deceleration of the grenade flight, the firing pin starts moving forward and leans against the tin foil and remains in this position until the grenade strikes an obstacle. At the moment of contact with the target, due to inertia force, the firing pin strikes the detonator primer and fires. Action of the primer is transferred to the detonator which activates the explosive charge.

93. After firing an antipersonnel grenade (TTM M60) with the fuze UTI M60 (Fig. 40) powder gases force the grenade forward. Due to inertia the arming ring starts moving backward, compresses its spring and releases the arming ball which falls cut into the groove of primer carrier guide. When inertia ceases to act, air resistance causes deceleration of the grenade flight which makes the primer carrier slow down its advance

motion too. Arming of the fuze is completed when the primer carrier reaches its front position, close to the firing pin and leans by its front end upon the abutment. In this position the safety balls fall into widened part of the primer carrier and lock it. This occurs while the grenade passes the distance 4—5 m in front of the launcher.

When the grenade hits an obstacle, due to reaction force the firing pin breaks its lock and starts moving backward (in regards to direction of the grenade motion), compresses its spring and strikes the primer which starts burning. Primer flame sets fire to the intensifier which, in turn, transfers the flame to the detonator.

Explosion of the detonator activates the explosive charge.

94. After firing an antipersonnel grenade (TTM M60P1) with the fuze UT M70P1 (Fig. 41), due to inertia, the arming ring lags behind overcoming resistance of its spring. Moving downward the arming ring allows the locking balls to fall into free space between the fuze body and guide. When acceleration of the grenade ceases, the arming ring spring pushes the ring upward which rests by its shoulders against the firing pin support. In this position, the arming ring sets free the arming ball which falls out of its seat in the firing pin and guide. Released firing pin, its support and guide, being pressed by the arming ring spring, start moving upward to the safety ring upon which the firing pin support leans by its shoulders. Moving upward, the firing pin goes out of the primer carrier body thus allowing the primer to align with the firing pin and transfer charge under the action of the primer carrier spring. In this manner igniter train of the fuze is set up. The primer carrier is fixed in arming position by the lock lifted by its spring to fall into the slot in the support.

When the grenade hits an obstacle, due to reaction force, the firing pin support with firing pin starts moving backward. The firing pin strikes the primer and initiates it. Through the transfer charge and detonator, initiation is transferred to the explosive charge in the grenade.

95. When a smoke or illuminating grenade equipped with the fuze DI M62 (Fig. 43) is fired, due to inertia, the primer carrier compresses its spring, the primer strikes against the firing pin and is activated. During this, the grenade is still on the launcher. The primer sets fire to the retarder which, after combustion (4,5 or 7,5 s) sets fire to the ejection charge of the grenade.

Simultaneously, the ejection charge separates the grenade and sets fire to the smoke and illuminating mixture respectively.

Generally, the smoke box is separated from the fuze chamber on the falling branch of the path, and then continues its flight to the target leaving a visible smoke trace. When it hits the ground it produces thick and white smoke intensively for 80—90s. If the grenade hits the ground before the smoke box is separated from the fuze chamber, the smoke will still be produced since the smoke mixture burns through the fuze chamber.

If the grenade does not penetrate deep into the ground, the smoke box will be separated from the fuze chamber as described in the previous paragraph.

Separation of the illuminating grenade is effected on the falling branch of the grenade path after which the illuminating torch illuminates the ground.

## 6) SAFE POSITION OF THE WEAPON

96. To make the weapon safe it is necessary to shift the fire selector lever to the position »U« — safe. The fire selector body by its lug engages the trigger rear lug and prevents it from turning forward and upward. This locks the hammer thus making triggering impossible.

Locking of the weapon provides for the following:

- prevents accidental firing,
- prevents feeding of the round into the barrel since the fire selector lever does not allow the bolt carrier to move into rear position and
- closes the split part of the cover thus preventing penetration of dirt into the receiver.

## 6. STOPPAGES DURING FIRING AND HOW TO ELIMINATE THEM

97. If the weapon is properly handled, maintained and kept, it operates reliably and without stoppages.

However, after longer period of usage, due to wear and breakage of parts, dirt, incorrect ammunition and improper handling some incorrectnesses may occur which causes stoppages. To prevent stoppages it is necessary to observe the following rules:

- officers and soldiers must strictly follow the instructions for handling, stripping, cleaning, assembling and inspection of the weapon;

- magazines and ammunition must be checked before firing;

- the weapon must not be loaded by incorrect and dirty ammunition;

- ammunition must be wiped by a dry cloth before loading;

- the weapon must be carefully kept during firing, while running and halting in combat situation, and

- in case of a stoppage wait for 5 s, pull the bolt into rear position and proceed with firing. If the stoppage recurs, unload the weapon, find the cause of the stoppage and eliminate it, if possible. If the stoppage cannot be eliminated, the weapon must be sent to the repair shop.

98. The Table I shows the possible stoppages, their causes and how to eliminate them.

TABLE I

Stoppage	Cause	Remedy
1) The bolt fails to feed the round into the chamber	<ul style="list-style-type: none"> <li>— cartridge follower spring broken or jammed,</li> <li>— cartridge follower jammed,</li> <li>— thickened lubricant and dirt inside the magazine make proper functioning of the spring and follower impossible.</li> </ul>	<ul style="list-style-type: none"> <li>— take the magazine out and find the cause of stoppage eliminate it and proceed with firing. If the stoppage recurs, replace the magazine.</li> </ul>

Stoppage	Cause	Remedy
2) Round falls out of the magazine, gets jammed between the bolt and barrel or is stuck	<ul style="list-style-type: none"> <li>— magazine lips deformed (widened) or</li> <li>— magazine has not fully entered the receiver slot or is loose within it</li> </ul>	<ul style="list-style-type: none"> <li>— pull the bolt backward and proceed with firing. If the stoppage recurs, replace the magazine and proceed with firing.</li> </ul>
3) The bolt fails to lock and firing is not possible	<ul style="list-style-type: none"> <li>— deformed round or dirty cartridge chamber</li> </ul>	<ul style="list-style-type: none"> <li>— pull the bolt backward, eject the round and proceed with firing.</li> </ul>
4) Misfiring	<ul style="list-style-type: none"> <li>— incorrect round,</li> <li>— dirty firing pin seat,</li> <li>— broken firing pin,</li> <li>— weakened or broken hammer spring, or</li> <li>— broken hammer</li> </ul>	<ul style="list-style-type: none"> <li>— pull the bolt backward and eliminate the incorrect round and proceed with firing. If misfiring recurs unload the weapon, find the cause of stoppage and send it to the repair shop.</li> </ul>
5) The bolt remains in front position after firing	<ul style="list-style-type: none"> <li>— grenade launching sight is in vertical position</li> </ul>	<ul style="list-style-type: none"> <li>— shift the grenade launching sight to horizontal position and proceed with firing.</li> </ul>
6) Cartridge case has not been ejected and the next round strikes against the cartridge case which remained in the chamber	<ul style="list-style-type: none"> <li>— cartridge case extractor broken, or</li> <li>— extractor spring weakened or broken</li> </ul>	<ul style="list-style-type: none"> <li>— pull the bolt backward and retain it in rear position, eliminate the round and push the case out by the rod. Replace the extractor or extractor spring in the repair shop.</li> </ul>

Stoppage	Cause	Remedy
7) Slight displacement of the cartridge case and return into the chamber which results in jamming	<ul style="list-style-type: none"> <li>— insufficient bolt recoil force so that the cartridge case does not reach the ejector</li> <li>— excessive gap between the piston and gas chamber</li> <li>— insufficient powder charge</li> <li>— excessive friction during bolt movement or gas port clogged</li> </ul>	<ul style="list-style-type: none"> <li>— unload the weapon, if the case has remained in the chamber push it out by the rod, clean the gas port and proceed with firing.</li> <li>If the stoppage recurs, send the weapon to the repair shop</li> </ul>
8) Cartridge case has been jammed between the bolt face and receiver	<ul style="list-style-type: none"> <li>— the same cause as under 7)</li> </ul>	<ul style="list-style-type: none"> <li>— pull the bolt backward, eject the jammed case and proceed with firing. If the stoppage recurs, eliminate dirt and proceed with firing or send the weapon to the repair shop.</li> </ul>
9) Last round fired, the bolt, however, does not remain in the rear position but returns into the front position	<ul style="list-style-type: none"> <li>— cartridge follower jammed in the magazine</li> </ul>	<ul style="list-style-type: none"> <li>— replace the magazine and proceed with firing.</li> </ul>

## 7. FIRING ACCURACY AND PRECISION TESTING

99. Weapon must be ready for accurate and precise fire. Accuracy of firing is to be tested always when the front sight has been displaced to any side, when shots in firing are not grouped around the aiming point, after replacement of parts which could affect firing accuracy and when accuracy and precision data is not available.

100. Weapon firing accuracy in the unit is to be tested by the commission appointed by the commander of the regiment (independent battalion). The commission consists of commander of the company, commander of the platoon and gunsmith. Two or three excellent shooters (soldiers, officers or professional shooters) are to be assigned to the commission. The soldier whose weapon is being tested is also present during the test.

101. Before the testing the weapon must be cleaned and then inspected to make sure whether the front and rear sight, bolt, triggering mechanism, recoil mechanism and barrel are in correct condition.

**Firing accuracy must not be tested by an incorrect weapon.**

102. Weapon accuracy and precision shall be tested only under favourable atmospheric conditions (hot and nice weather, with no rain/snowfalls and wind), or in a tunnel or a part of the shooting range protected from wind and rain/snowfalls.

103. Accuracy and precision shall be tested by firing 4 live cartridges with normal bullet, from the same lot and original package. Firing range is 100 m, sight division »3«. On LMG, the windage scale is in zero position (notch of the windage scale plate with white line is against the medium line on the scale). Lying firing position is used with a stand or bipod with LMG.

104. Firing is made at the practice target 1×1m with attached target for testing of weapon accuracy and precision (Fig. 69).

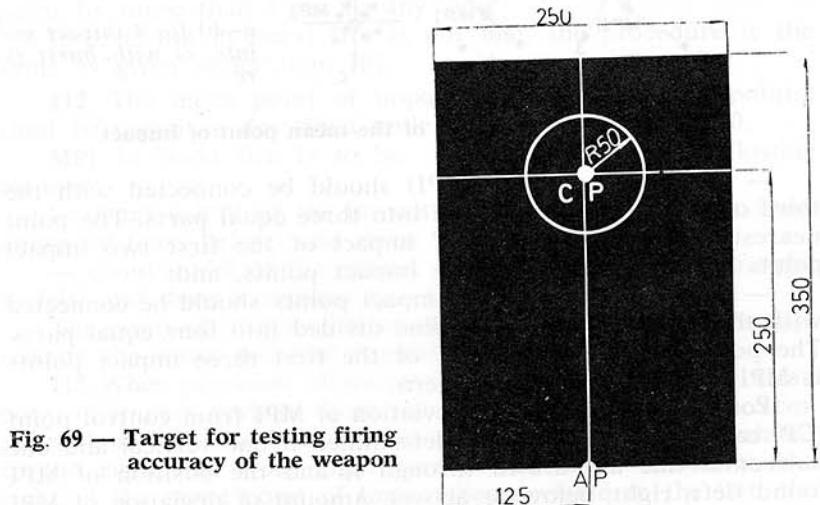


Fig. 69 — Target for testing firing accuracy of the weapon

The aiming point is the middle of the bottom edge of the black rectangle which must be in the horizon of the weapon. At 25 cm above the aiming point a spot is marked by another colour representing the position of mean impact point (control point) around which a circle of 5 cm in diameter is drawn.

**105.** Upon completion of firing it is necessary to determine the amount of dispersion and position of the mean impact point in regards to the control point.

**106.** Precision and accuracy requirements will be met if out of 4 shots at least 3 impact points are found within a circle of 15 cm in diameter whereat the mean impact point must not deviate from the control point by more than 5 cm.

**107.** If precision requirement is not met (excessive dispersion) the firing shall be repeated; if the excessive dispersion recurs such a weapon will not be tested any longer and will be sent to the repair shop to be repaired.

**108.** If precision is found satisfactory, it is necessary to determine accuracy of the weapon. Firing accuracy is to be determined by finding the mean impact point on the dispersion pattern, by locating its position and deviation from the control point. The mean point of impact (MPI) for 4 shots shall be determined in the following manner (Fig. 70):

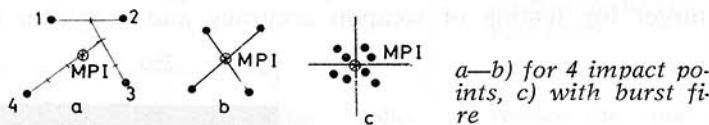


Fig. 70 — Determination of the mean point of impact

— the obtained point (MPI) should be connected with the third one and this line divided into three equal parts. The point nearest to the mean point of impact of the first two impact points is MPI for these three impact points, and;

— MPI of the first three impact points should be connected with the fourth one and this line divided into four equal parts. The point nearest to the MPI of the first three impact points is MPI of the dispersion pattern.

Position and amount of deviation of MPI from control point (CP) can be more accurately determined if one vertical and one horizontal line are drawn through it and the position of MPI found (left, right, below or above). Amount of deviation of MPI horizontally and vertically is measured by a ruler.

**109.** In case of symmetric arrangement of impact points, MPI shall be determined as shown on Figure 70b.

MPI is to be determined only if precision of the weapon is satisfactory.

**110.** If dispersion is not satisfactory, when all four impacts or three at least cannot be enclosed by a circle of 15 cm in diameter (the impact points which contact the circle from outside are also considered as valid), the commission shall find the cause of the dispersion. When the cause has been found and the weapon repaired the firing shall be repeated by the same shooter. If dispersion is again greater than allowed, another shooter will fire with the same weapon.

If precision is still not satisfactory the testing will be stopped and the weapon with three dispersion patterns obtained will be sent to the repair shop as incorrect in regards to dispersion.

**111.** Upon completion of single fire test, the light machine gun shall be tested by burst fire. Firing shall be made as described under items 99 through 104; 8 rounds shall be fired in 2—3 short bursts.

Precision and accuracy requirements of the light machine gun in burst fire shall be considered as met if at least 6 impact points can be enclosed by a circle of 20 cm in diameter whereat the mean point of impact must not deviate from the control point by more than 5 cm to any side.

If precision in burst fire is not met, the procedure is the same as given under item 107.

**112.** The mean point of impact (from four impact points) shall be found as described under items 108 through 110.

MPI in burst fire is to be determined in the following manner:

— count a half of the impact points vertically (either from above or from below) and draw a horizontal line, and;

— count a half of the impact points horizontally (from right to left) and draw a vertical line (Fig. 70c).

The point of intersection of vertical and horizontal line represents the mean point of impact.

**113.** When precision (dispersion) is satisfactory and the mean point of impact deviates from the control point more than 5 cm, proceed as follows: if the mean point of impact has deviated to the right, the front sight carrier should be moved to the right; if the mean point of impact has deviated to the left, the front sight carrier should be moved to the left, if the mean

point of impact is below the control point the front sight should be brought down by screwing on; and, if the mean point of impact is above the control point, the front sight should be raised by screwing off.

**114.** Amount of displacement of the front sight carrier or raising (lowering) of the front sight depends upon the amount of deviation of MPI and on the length of aiming line of the weapon as shown in Tables 2 and 3.

TABLE 2

Deviation of M P I to any side in cm	5	7,5	10	12,5	15	17,5	20	22,5	25
Displacement of front sight in mm (horizontally)	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
AR	0,25	0,4	0,54	0,61	0,8	0,92	1,05	1,16	1,3

TABLE 3

Turning (screwing on/off) of the front sight by	1/4 turn	1/2 turn	3/4 turn	1 full turn					
	AR	LMG	AR	LMG	AR	LMG	AR	LMG	
	4,68	3,56	9,37	7,12	14,05	10,68	18,75	14,25	

**115.** The following examples illustrate how to calculate deviation of the mean point of impact if the front sight is moved to any side by 1 mm:

**Example 1:** Length of aiming line of the light machine gun 7,62 mm M72 is 525 mm. The testing shall be made at the distance of 100 m or 100.000 mm. Therefore, the following proportion can be set up: 525 : 1 = 100.000 : X

$$X = \frac{100.000 \cdot 1}{525} = 190 \text{ mm or } 19 \text{ cm}$$

**Example 2:** Length of aiming line of the automatic rifle is 395 mm, and firing range is 100 m or 100.000 mm. Based upon the formula from the Example 1, displacement of the front sight by 1 mm moves the MPI by 25 cm.

**116.** Displacement of the front sight carrier or change of height of the front sight by screwing on/off shall be made by the gunsmith on the spot by means of adequate tools. The front sight carrier can be moved laterally until it is aligned with the external surface of the front sight base.

**117.** After displacement of the front sight carrier or change of height of the front sight by screwing on/off, it is necessary to fire 4 rounds at the same target. Again, accuracy of the weapon is to be determined according to regulations given under items 108 and 109; if it is not satisfactory, it is necessary to correct the weapon again and to repeat the firing.

If due to significant deviation of the mean point of impact the need arises to move the front sight carrier to the right (left) more than allowed the firing is to be made by another shooter. If the same results are obtained the testing shall be stopped and the weapon sent to the repair shop as incorrect in regards to accuracy.

**118.** After horizontal displacement of the front sight carrier, the previous mark (line) on the front sight carrier is to be cancelled and a new one impressed.

Upon completion of the testing, the target pattern obtained is to be drawn on a sheet of paper in the scale 1:5. The data on weapon number, date, time, temperature and height above sea level shall be also given on the sheet and signed by the members of the commision.

This data shall accompany the weapon technical booklet to illustrate precision and accuracy of the weapon, when necessary.

**119. Accuracy of the night sight** shall be tested only when parts of the sight are replaced and when the weapon is overhauled.

If during usage due to dropping or striking the front or rear night sight has got damaged (distorted), they must be straightened or replaced by new ones. Accuracy of the night sight should not be tested if other parts of the sight are not damaged and if the damaged night sights are successfully repaired (replaced).

**120. Incorrectnesses of the weapon which affect accuracy of firing:**

— if the rear sight is higher than necessary, the weapon will hit high, while if it is lower, the weapon will hit low; just opposite is the case with the front sight,

— if the rear sight is laterally displaced, the point of impact will be moved to the same side to which the sight is displaced; just opposite is the case with the front sight,

— if there is a kick on the barrel muzzle, the bullet will deviate opposite to the position thereof, and

— bulging of the barrel bore, particularly in its front part, worn lands, rust, corrosion to greater extent, scratches inside the barrel and the like lead to greater dispersion of shots in firing.

## 8. TESTING OF ACCURACY AND PRECISION IN FIRING OF THE WEAPONS EQUIPPED WITH PASSIVE SIGHT 5x80

**121.** Rectification of the passive sight is to be made at daylight or twilight in the following manner:

— insert (charged) battery into its seat, switch the voltage on, check intensity of illumination of the picture in the field of view and sharpness of reticle and then switch the voltage off;

— fit the passive sight to the weapon and fix it by its wing lock;

— place the weapon with passive sight upon the rest (in a channel cut in the rampart) and secure the weapon against horizontal and vertical swinging;

— by means of mechanical sight with division »3« aim at the bottom of the aiming point (black circle of 10 cm in diameter) on the practice target 1×1m, at the range of 100 m, and switch on the voltage to the passive sight;

— through the ocular of the passive sight check where the top of the reticle ends. If the top of the reticle ends at the bottom of the aiming point, the passive sight is adjusted for firing test.

**122.** When the top of the reticle deviates from the aiming point, it is necessary to move it and bring it to the same aiming point as the mechanical sight:

— switch the voltage on, adjust intensity of illumination, sharpness of the picture and diopter;

— by means of a small hexagonal wrench (from the accessories) turn the screw on the left side of the reticle holder

to bring the reticle horizontally into the same plane with the aiming point, and then check whether aiming with the mechanical sight is not disturbed;

— by turning the screw on the front side of the reticle holder bring the top of the reticle vertically to the bottom of the aiming point and check aiming by the mechanical sight again.

If during rectification of the passive sight the line of sight of the mechanical sight becomes disturbed, the rectification shall be stopped and the complete procedure repeated. In order to speed up the operation of rectification the weapon should be firmly fixed on its rest while in handling with the wrench one must be very careful and frequently check the line of sight of the mechanical sight.

**123.** After adjustment of the passive sight, it is necessary to make checks according to regulations given under items 102 through 110 and 113 through 118.

## 9. TESTING OF ACCURACY IN FIRING WITH RIFLE GRENADES

**124.** Accuracy of firing with rifle grenades is to be tested when during firing it becomes evident that shots deviate horizontally or vertically from the control point. During the testing, the launcher cannot be adjusted for accurate fire since its sight is stationary, instead, the aiming point must be transferred to the opposite side by the amount of deviation of the mean point of impact.

Accuracy of firing with rifle grenades shall be tested at practice target sized 2 × 2m (covered with sackcloth) at the range of 50 m. Aiming point is a black circle (20 cm in diameter) in the centre of the target. To provide for easier finding of the mean point of impact the target must be divided by one horizontal and one vertical line crossing each other in the centre of the aiming point.

Five practice antitank grenades shall be fired from lying position using the stand. The mean point of impact shall be determined as specified under items 108 and 109.

Deviation of the mean point of impact is to be entered into the technical booklet of the rifle and in firing it is to be taken as the aiming point.

## Chapter II

### 1. KEEPING OF WEAPON AND AMMUNITION

#### 1) KEEPING OF WEAPON

**125.** The weapon must be always in correct condition and ready for action. The soldier is obliged to take care of the weapon, to clean and maintain it, to handle with it carefully and to inspect it every day to make sure that it is in correct condition.

**126.** In barracks and in camps the weapon is kept in the racks as unloaded; the bolt must be in front position, triggering mechanism in fired position, sight leaf in rear position, grenade launching sight on AR folded and fixed, front night sights folded, bipod on LMG folded and fixed and the weapon on safe position. Knife of the automatic rifle is kept in its scabbard hooked upon a nail in the rack. The bag with accessories and magazines of AR and LMG is kept in the partitions of the rack or hooked upon the nail.

The weapon with folding stock is kept in the rack with extended stock and shoulder support.

**127.** While camping the racks with weapons should be covered with tent canvas or any other blanket especially at night and when it is raining/snowing.

**128.** In watchhouse the weapon is kept according to item 126, and loaded magazines are kept in the accessory bag.

In inhabited places the weapon is to be kept empty on a suitable place and far from fire and furnace. Leaning the weapon against the wall or other objects is not allowed. In a building the light machine gun may be kept on its bipod, too.

In a building, tent or shelter the weapon should be always carried in hand taking care not to strike against the wall, staircase or any other hard object.

**129.** In marching the weapon should be carried on the right shoulder over the back or chest. At halts the rifles are to be laid down on the ground supported by the bolt handle, and the light machine guns supported by the bipod.

**130.** In transport by railway or ship weapons should be held vertically between the legs or laid on shelves. In a car or aircraft weapons are always held between the legs carefully so that they cannot fall down and get damaged.

If the weapons are provided with folding metal stock, the stock should be extended.

**131.** No object may be hooked upon the weapons. One soldier must not carry more than two rifles — light machine guns, one in each hand or on each shoulder, which must not touch each other.

**132.** Accessory bag of the automatic rifle/light machine gun is to be carried by the soldier — gunner in charge of the weapon. Ammunition bag from the set of the light machine gun is to be carried by the soldier assigned from the section.

**133.** Clogging of the barrel of the weapon by any object is not allowed since it would cause bulging and bursting of the barrel in firing.

**134.** At exercises and in combat situations take care not to strike with the weapon against a hard object, do not let sand and soil enter the receiver and magazine and take care not to damage the muzzle and sights.

Before usage weapon should be cleaned from lubricant, inspected and its ammunition cleaned.

**Loading the weapon or magazines with incorrect rounds is not permitted.**

**135.** Each incorrectness on the weapon must be reported by the soldier to his superior officer who is obliged to send such a weapon to be repaired. The soldier is not allowed to make any repairs of the weapon.

**136.** At exercises and on any other occasion barrel of the weapon must be turned upward or aside past the personnel and buildings to avoid accidents.

**137.** Accessories of the weapon are to be kept in the same manner as the weapon itself.

## **2) KEEPING OF AMMUNITION**

**138.** Ammunition should be kept in dry rooms protected from moisture, arranged by calibre, type, powder lot and loading lot. Ammunition must be kept in original packages.

**Keeping unpacked live or blank ammunition in storage is not permitted.**

**139.** In peace, after firing or exercise, unused ammunition or ammunition which has failed should be immediately returned to the storage provided for keeping of ammunition.

**140.** In combat situation, ammunition is to be kept by soldiers and in the company supply station. The soldiers carry the ammunition in magazines, keeping it from moisture. The ammunition carried by soldiers in ammunition bags must be in original packages.

In company supply station the ammunition is kept in original cases.

**Different types of ammunition must not be kept in the same case.**

**141.** Practice rounds intended to be used are kept by soldiers in the magazine carried in the bag. The practice rounds not intended to be used are kept in the storage in a case provided for that purpose.

**142.** Rifle grenades are to be placed and kept in dry rooms protected from moisture and separated by types and purpose. In transport of rifle grenades, the cases should be positioned in such a manner that longitudinal axis of the grenade is transversal to direction of movement of the vehicle and the cases must be secured against falling.

**143.** In combat situations, the soldier — rifle grenade shooter carries the bag on his shoulder. Live grenades must be handled with due care in order to avoid unwanted consequences or stoppages during engagement.

**144.** In order to avoid unwanted consequences in handling with the rifle grenades, the following is **forbidden**:

- to screw off the grenade stabilizer,
- to take off the transport safety and to take the grenade cartridge out of the stabilizer — unless firing is intended,
- to disassemble the grenade (this can be done by experts only),
- to remove adhesive tape from smoke and illuminating grenades,

- to use live grenades for training except for live firing,
- to use grenade cartridge not provided with sealing mass,
- to use the live cartridge 7,62 mm to launch the grenade,
- to touch and move unexploded grenades after firing (these grenades must be destroyed by a pyrotechnician on the spot),

- to use the grenades with observed mechanical damages (kicks, deformed stabilizer or transport safety, and the like),
- to use the grenades which do not bear corresponding labels, and,
- to strike with grenades against hard objects or to immerse them into water.

**145.** Practice grenades (clean and correct) shall be kept in the storage. Keeping the practice grenades complete with the markers and using them when they are incomplete or incorrect is not permitted.

## 2. BASIC MAINTENANCE OF WEAPON AND AMMUNITION

**146.** Purpose of basic maintenance is to ensure permanent correctness of the weapons and ammunition in usage and in storages.

Basic maintenance of weapon includes daily inspections, cleaning and lubrication, and periodic (weekly) inspections.

**147.** Daily inspections are made in order to have correctness and completeness of weapons permanently under control. The inspections are to be made by the commander of the section and the soldier in charge of the weapon.

The daily inspection includes: inspection before use, during use and after use. Before and during use the weapon should be inspected as assembled, while for the inspection after use the weapon shall be stripped and cleaned.

### 1) INSPECTION OF AUTOMATIC RIFLE

**148.** Inspection of assembled rifle is made to see:

- whether it is empty;
- whether metal parts are free from corrosion, scratches and kicks, and whether wooden parts are free from cracks;
- whether the bolt can be easily pulled back, returned forward by the recoil mechanism and retained by the cartridge follower;
- whether in locked position of the bolt blocking and firing of the triggering mechanism is possible;
- whether the sights are correct, whether they can be folded and the leaf moved;

- whether the barrel muzzle is not clogged, and barrel bulged or cracked;
- whether the cover catch fixes the cover properly;
- whether the fire selector lever can be easily shifted from one position to another;
- whether the magazine catch fixes the magazine properly in the receiver and whether it is not loose;
- whether the gas cylinder lock is in proper position and fixes the gas cylinder;
- whether the muzzle protecting ring, compensator, grenade launcher or blank ammunition attachment can be easily screwed onto the barrel muzzle and whether the muzzle protecting ring securing pin is in correct condition;
- whether the metal folding stock can be folded easily and properly;
- whether the accessories are complete and correct;
- whether the spring which holds the grenade on the launcher is in correct condition.

After the inspection take the magazine and load it with practice ammunition checking the follower and follower spring for correct functioning. Place the loaded and correct magazine into the receiver, pull the bolt back and release it forward abruptly, checking whether the bolt grips and feeds the round into the chamber and how it is locked. Take the magazine out of the receiver, pull the bolt back checking whether the extractor takes the round out of the chamber and whether the ejector ejects it through the slot on the receiver cover.

**149.** Inspection of stripped rifle is intended for checking of correctness of individual parts as follows:

#### Barrel:

- check for kicks, scratches, dirt and corrosion on external surfaces;
- check barrel bore for soot, dirt, corrosion, scratches and see if the barrel is enlarged or bulged.

#### Sights:

- check the front sight with guard for deformation, and see if the lines on front side of the sight base and front sight carrier coincide;
- check whether the night sight is held by its spring in raised and folded position, and whether the illuminating dot is not damaged;
- check the grenade launching sight for damage and see if it can be fixed in raised and folded position;

— check the springs of leaf and rear sight slide for correctness, and whether the leaf is free from kicks and scratches which could disturb proper functioning of the slide; whether the leaf is not distorted and whether the aiming slot is free from scratches and kicks which could make proper aiming impossible, and

— check whether the rear night sight can be properly folded and see if the illuminating dots are not damaged.

#### **Gas chamber and gas cylinder:**

— make sure that the gas port is not clogged and that there is no corrosion, dirt and soot, and

— make sure that there are no kicks, corrosion and dirt on the gas cylinder.

#### **Recoil mechanism:**

— make sure that the parts are free from corrosion, dirt and soot,

— check the recoil spring for correctness;

— check the front and rear guides for correctness — whether they are free from kicks, cracks and other deformations.

#### **Bolt and bolt carrier with piston:**

— check whether grooves and holes on the bolt are free from kicks and scratches, and whether the cartridge pusher is not worn or damaged;

— make sure that the extractor lug is not damaged and see if the spring holds it properly within its seat;

— make sure that the bolt guiding and locking lugs are not damaged and firing pin top broken;

— check whether grooves, holes and lugs on the bolt carrier are not damaged, dirty and corroded, and

— make sure that the piston is properly connected to the bolt carrier, and check it for kicks, corrosion and scratches.

#### **Receiver with handgrip:**

— check the receiver for kicks, scratches, rust and dirt;

— check whether the cartridge case ejector is not broken;

— check the cover catch for correctness and functioning;

— check the magazine catch for correctness, and

— make sure that the handgrip is properly fixed by its screw and that there are no cracks.

#### **Receiver cover:**

— check it for deformations, kicks, scratches, dirt and corrosion, and

— make sure that it fits properly into the semi-circular groove on the rear sight base and cross groove on the receiver, and see if it is fixed by its catch.

#### **Triggering mechanism:**

— check whether the hammer spring, full automatic sear spring, disconnector spring and rate reducer spring are not broken,

— make sure that individual parts of the mechanism are not broken or damaged or dirty, and

— make sure that the fire selector is not distorted and see if its lever can be easily shifted into all three positions.

#### **Stock:**

— make sure that the stock is properly fixed to the receiver and check it for cracks;

— see if the folding stock and shoulder support can be easily folded and check them for deformation;

#### **Knife with scabbard:**

— check the knife and scabbard for corrosion and dirt;

— make sure that the knife can be easily fitted on and removed from the rifle, and

— check the parts of knife and scabbard for damage and deformation.

#### **Accessories:**

— check the accessories for completeness;

— make sure that the parts are clean and correct;

— check whether the magazines (drums) are correct, whether they can be easily loaded and fixed in the receiver, and

— make sure that the oil can is filled with lubricant.

## **2) INSPECTION OF LIGHT MACHINE GUN**

**150.** Inspection of assembled light machine gun is to be made according to item 148, taking notice of the following:

— receiver cover is fixed by the protrusion on the recoil spring rear guide;

— check correctness and functioning of windage scale, and

— check correctness and fixing of bipod in folded position.

**151.** Correctness of stripped light machine gun is to be checked according to item 149 with following addition:

#### **Sights:**

— check correctness and functioning of windage scale, and

— make sure that the rear night sight is not deformed, check whether it can be easily fitted on and removed from the windage scale and whether the illuminating dots are not damaged.

#### Bipod:

- check them for dirt, corrosion and deformation,
- make sure that the bipod retaining spring is not broken or deformed,
- make sure that the bipod legs spring is not broken and see if the legs can spread, and
- check whether the slant surfaces on the top part of the legs with shoes are not deformed.

152. Periodical inspections are to be made with stripped weapons according to item 149 and 151; after assembling, functioning of parts of the weapons should be checked using practice ammunition.

### 3) INSPECTION OF AMMUNITION

153. **Live cartridges** are to be inspected by the officer and soldier who receives them for usage. Purpose of the inspection is to check the ammunition for correctness and cleanliness.

During the inspection check the following:

- whether the designations on the cartridge case bottom correspond to those on the ammunition packing case,
- whether cartridges are free from dirt, corrosion or oxide,
- whether there are no kicks or scratches on the cartridge case,
- whether there are no cracks on the cartridge case, and
- whether the bullet is not stamped into the cartridge case, scratched, deformed or loose.

After inspection of the cartridges, the soldier is obliged to clean them by a dry cloth, to load them into magazines and to keep them carefully. Using incorrect ammunition is not permitted.

154. **Blank and practice ammunition** should be inspected as described under item 153 watching especially carefully that the blank and practice rounds are not mixed with live ones.

155. **Live rifle grenades** should be inspected just prior to using them. The soldier — grenade shooter in combat inspects

the grenade individually while at firing exercises he does it under control of the officer. Purpose of the inspection is to check the following;

- whether the grenade is complete;
- whether the designations on the grenade are identical to those on the packing case;
- whether the transport safety is screwed into its seat;
- whether the stabilizer fins are not damaged;
- whether the stabilizer is fully screwed and its interior clean;
- whether the grenade cartridge is in correct condition and its cartridge case top provided with sealing mass; and
- whether the grenade is free from kicks and damages.

The grenades with visible damages, missing transport safety and with damaged fins shall be separated and destroyed. Incorrect grenade cartridge shall be destroyed and replaced by new ones. They must be destroyed by an expert — pyrotechnician.

Screwing off the grenade head and stabilizer of the grenades which have fallen down during transport or handling, and carrying and transportation of grenades without the transport safety is not permitted.

156. Practice rifle grenades are to be inspected before, during and after use. Purpose of the inspection of the grenades is to see if they are complete and in correct condition for further use. The following items should be inspected:

- whether the stabilizer, head and rubber cap of the practice antitank grenade are free from damages and deformations, and
- whether the fuze, grenade case and stabilizer of the practice antipersonnel grenade are free from damages and deformations and whether the firing pin can be screwed off from the fuze body.

Incorrect parts of grenades must not be used for firing again.

### 3. CLEANING AND LUBRICATION

#### 1) GENERAL REGULATIONS

157. Cleaning and lubrication of weapons shall be performed by the soldiers who directly handle with them, supervised by the officer; if necessary, adequate assistance shall be given by the experts.

**158.** Weapons being used in the unit are exposed to permanent harmful influence of powder combustion products, humidity, temperature change and impurities which cause corrosion or rust. In order to prevent these harmful effects the weapons must be regularly and properly cleaned, lubricated and kept in correct condition.

**159.** Purpose of cleaning and lubrication of the weapons is to eliminate impurities and old lubricant and to protect them from corrosion by repeated lubrication.

The weapons must be cleaned and lubricated every day, after each use. If the weapons are not used but kept in the company's storage, they should be cleaned and lubricated only at periodical (weekly) inspection.

In combat, marching and exercises the weapons must be cleaned and lubricated every day using breaks during combat or exercises.

**160.** For cleaning of the weapons, the commander of the section is obliged:

- to command stripping and cleaning of weapons,
- to check soldier's accessories for correctness, availability and quality of means for cleaning and lubrication,
- to check whether cleaning and lubrication are performed properly, and
- having checked that cleaning has been performed properly and completely, he commands lubrication of the weapons, checks how it is lubricated and finally commands the soldier to assemble the weapon and place it into the rack.

**161.** Weapons are to be cleaned and lubricated on a table, bench or clean rug. Cleaning accessories must be in correct condition, and the means for cleaning and lubrication clean and of good quality. Cleaning detergent (DRNČ) is to be used by means of a brush, cloth, oakum and a small stick of soft wood.

**162.** At winter, at low temperatures, weapons should be cleaned in the rooms where the temperature is approximately the same or same as that in the room the weapons are to be kept in, so as to prevent »perspiration« of the weapons.

When the weapons are brought into the room for cleaning, and there is a significant difference between the temperatures outside and inside the weapons should be left »to perspire« and then cleaned immediately without drying.

## 2) MEANS FOR CLEANING AND LUBRICATION

**163.** The following means shall be used for cleaning and lubrication of weapons:

**Solvent detergent for cleaning of weapons (DRNČ)** based on naphtha derivates, with detergent and anti-corrosion additives. It is used for elimination of powder combustion products (soot) and degreasing of metal surfaces. Since it contains detergent and anti-corrosion additives, it is suitable for cleaning and degreasing of metal surfaces, and for protection of degreased surfaces as well. The surfaces cleaned from corrosion and lubricated by fresh solvent DRNČ will remain protected for approximately 20 days.

### **DRNČ must not be used near open fire — flame.**

When working with DRNČ, always pour into the vessel only the quantity necessary for the operation because the solvent becomes filthy very soon and evapourates. After the quantity specified is used up, the vessel must be wiped by a cloth or oakum before adding new quantity of solvent.

**Linen cloth** is used for cleaning and lubrication; it must be clean, free from dust, sand and hard edges.

**Oakum** which is used for cleaning of all parts of the weapon must be clean, free from dust and sand.

**Small sticks of soft wood** wrapped into a cloth or oakum are used for cleaning of cartridge chamber, interior of receiver, triggering mechanism, bolt, sights, gas chamber, etc.

**General purpose protective oil (ZUON)** is used for lubrication of weapons in use. It is based on mineral oils and anti-corrosion additives. When kept in closed room, the parts of weapons lubricated by this oil will be protected for 6 months.

**Protective solvent (SZN-M)** is intended for preservation of the weapons to be kept in storage more than 6 months. The solvent protects the weapons up to 5 years.

## 3) PROCEDURE OF CLEANING AND LUBRICATION

**164.** In order to eliminate powder combustion products, old lubricant and mechanical impurities the soldier brings the weapon to the vessel filled with DRNČ and dips the barrel muzzle into it. Commander of the section pulls a rod (or rods) with brush (or barrel cleaner wrapped into a rag or oakum) soaked

with DRNČ through the barrel 10—15 times; after that, the soldier leaves the barrel in horizontal position for 10—15 minutes (not more than 24 hours).

The soldier then cleans the barrel using two rods and brush, or barrel cleaner wrapped into a rag or oakum, or cleaning rope with a piece of cloth. After rubbing the barrel with DRNČ, barrel bore is to be cleaned by a dry rag. If traces of soot or dirt are observed on the rag, the procedure of cleaning the barrel with DRNČ and a dry rag is to be repeated until the dirt is eliminated.

**165.** When the barrel is cleaned by two soldiers using cleaning rope and rag (oakum) the procedure is as follows:

— the soldier in charge of the rifle — light machine gun holds the weapon by the receiver in the left hand turning the muzzle down, by his right hand he takes one end of the cleaning rope with rag in its loop and inserts the lead weight into the cartridge chamber pushing the rope through the barrel until the lead weight protrudes out of the muzzle and

— the other soldier (when the lead weight is out) takes the muzzle by his left hand and the rope by his right hand pulling it toward himself.

While pulling the rope through, the weapon barrel must be aligned with the axis of the rope so that the rope does not scrub the edges of barrel muzzle or the cartridge chamber. The rag or oakum has to be changed 5—6 times pulling it through the barrel until it goes out of the barrel clean.

If the barrel has not been coated with DRNČ before cleaning, the cloth has to be soaked with it at every change.

If the rag — oakum gets jammed during cleaning, the weapon must be sent to the repair shop to take it out.

**166.** When the weapon barrel is cleaned by one soldier using the rope and rag — oakum, the rope is to be inserted into the barrel as described in item 165. When the lead weight goes out of the barrel, the muzzle is to be turned up (into vertical position) and the rope pulled out upward, then turn the barrel muzzle down again and repeat the procedure changing the rag-oakum until it goes out clean.

**167.** The rod can be used for cleaning of the barrel only upon approval of the commander. Before using it screw the brush or barrel cleaner onto the top of the rod and pull the punch through the hole on its thicker part or fit the accessory

box (Fig. 71). The rod with barrel cleaner may be pulled through the barrel only if the barrel cleaner is wrapped into a rag or oakum. **Inserting the barrel cleaner without the rag — oakum into the barrel is not permitted.**

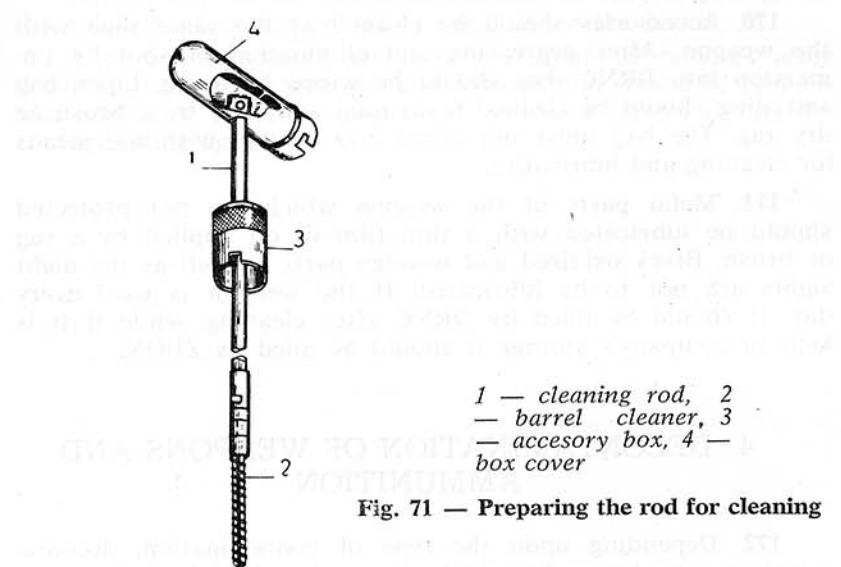


Fig. 71 — Preparing the rod for cleaning

**168.** Other metal parts exposed to powder gases or corroded are to be cleaned by wiping them with a rag or brush dipped into DRNČ (or immersing them into the vessel containing DRNČ). After 1—15 minutes they are to be cleaned by a clean rag—oakum until powder combustion products are eliminated.

**No metal objects may be used to remove soot from parts of the weapon.**

Black oxidized parts (surfaces) are to be cleaned by clean and dry rags, not rubbing them too much lest the black oxide coat should be removed.

Stock and handguard are to be cleaned by a dry rag or oakum only.

**169.** Night sights should be wiped carefully with a dry and clean rag. **Illuminating dots on the night sights must not be cleaned by sharp objects and solvents; touching them by hands,**

peeling the illuminating mass and touching the mouth or eyes is not permitted since it is made of tritium whose radiation is harmful to human organism. A closed room in which the light source has been broken must be ventilated immediately. Design makes it impossible for the light source to break, but yet it can happen in case of extremely careless handling.

170. Accessories should be cleaned at the same time with the weapon. After degreasing and elimination of soot by immersion into DRNC they should be wiped by a rag. Linen bag and sling should be cleaned from mud and dust by a brush or dry rag. The bag must not come into contact with the means for cleaning and lubrication.

171. Metal parts of the weapon which are not protected should be lubricated with a thin film of oil applied by a rag or brush. Black oxidized and wooden parts as well as the night sights are not to be lubricated. If the weapon is used every day, it should be oiled by DRNC after cleaning, while if it is kept in company's storage it should be oiled by ZUON.

#### 4. DECONTAMINATION OF WEAPONS AND AMMUNITION

172. Depending upon the type of contamination, decontamination may be: radiological, chemical and biological.

**Radiological decontamination** is carried out by washing contaminated parts in water solution of detergent (0,5—1%) or soap, using a brush, sponge or tampon made of rags, oakum, paper and the like.

For washing use running water in the first place, or pouring water. If water is not available, decontamination may be performed by rubbing with wet (dry) tampons or lumps of hay (straw). The tampons should be always pulled into the same direction turning the clean side after each pass.

**Chemical decontamination** is performed by applying the solution of decontaminating agents from the personal decontamination equipment. If this equipment is not available, decontamination may be performed by rubbing with tampons soaked with the solution of decontaminating agents (lime chloride 1:10, detergents — soaps 0,5 — 1%, naphtha, petrol).

Chemical decontamination is to follow directly the personal decontamination.

**Biological decontamination** is performed by rubbing with tampons soaked with water solution of lysol (3—5%) or formalin (4%).

During any of the decontaminations be careful not to let the solution of decontaminating agent enter the barrel.

After 5—10 minutes, and not later than 30 minutes after decontamination, the weapons and ammunition should be cleaned and lubricated in order to prevent corrosive effects of the decontaminating agents.

#### 1. GENERAL REGULATIONS

173. During fire, the combatant will not leave his position without permission of the commander, and he must not leave the weapon, observation of the battlefield, and choice of route, determination of distance to the target, and choice of aim and aiming position.

174. In accordance with setting the sight, bringing the weapon to the shoulder, aiming, shooting and firing:

— leave the field of fire;

175. Weapons can fire from various positions and roads are not from which the target or the gunner's body, the gunner reported may be seen.

From commandant the target does not see the soldier who is the first to approach the gunner, the gunner may not be seen by the target. Shooting, setting the sights, will be realized by the gunner he can fire in safety and — especially while he without shooting and off his hands.

In accordance to the command given the gunner assumes position for taking target measures to ensure his own safety and safety of surrounding soldiers.

The gunner must perform all operations with the weapon rapidly and automatically, while he keeps observing the target. He may stop observing the target only while setting the sight.

176. Site (platform) for firing with the light machine gun must be flat and hard enough to provide for stability in fire.

## Chapter III

### F I R I N G

#### 1. GENERAL REGULATIONS

173. Firing from the automatic rifle and light machine gun includes:

— **preparation for firing** (taking the firing position and loading the weapon, observation of the battlefield and choice of target, determination of distance to the target, and choice of sight and aiming point),

— **commence fire** (setting the sight, bringing the weapon to the shoulder joint, aiming and firing),

— **cease fire and stop firing.**

174. Weapons can fire from various positions and from any site from which the target or the ground where the enemy is expected may be seen.

When commencing fire from his site, the shooter takes a firing position depending upon ground conditions and enemy's fire (lying, kneeling, sitting or standing, with or without the rest). In motion he can fire in hunter's style — stopping for a while or without stopping, and off his hand.

In transport by car, armoured vehicle, ships and in moving on skis, the shooter takes the most suitable position for firing taking measure to ensure his own safety and safety of surrounding soldiers.

The soldier must perform all operations with the weapon rapidly and automatically, while he keeps observing the target. He may stop observing the target only while setting the sight.

175. Site (platform) for firing with the light machine gun must be flat and hard enough to provide for stability in firing.

On hard ground the bipod should be digged in a little, while on soft soil it should be placed upon clods or clumps of earth so that it cannot sink during engagement.

176. Weapons are to be loaded at the command »**PREPARE TO FIRE**« or without any command. This command implies standing firing position too. If necessary the command »prepare to fire« may be preceded by an indication of the firing position, for example: »**lie (kneel) down — PREPARE TO FIRE!**«. The lying (kneeling) position is to be taken at this command.

177. Fire may commence at the command and without the command, depending upon the task assigned and combat situation. At ranges up to 400 m, single fire from automatic rifles and light machine guns is to be opened at own initiative, and burst fire only upon the command of section/platoon's commander. Type of fire depends upon: type of target and its importance, range of firing and time during which the target will be exposed to fire.

178. Burst and single fire are used at firing at group and single targets. In principle, group targets are fired by long bursts and single ones by short bursts or single fire.

Sustained fire is generally used when firing group targets at shorter ranges, for example, when repulsing an attack and in counterattack, in ambush and in firing at air targets.

179. Command for commence fire includes: unit (shooter) that fires, target, sight, aiming point, amount of lead, type of fire, number of rounds (bursts) and executive part of the command.

180. At these parts of the command soldiers act as follows:

— at the part of the command: »**squad**« — all the soldiers listen carefully while observing the battlefield;

— at the part of the command: »**orienting point, tree, right 2, nearer 50, group of shooters**« — all the soldiers observe the target measuring (if necessary) indicated distance to the orienting point;

— at the part of the command: »**four**« — all the soldiers set the leaf slide to the division four taking care not to expose themselves to enemy's fire;

— at the part of the command: »**in the centre**« — all the soldiers unlock their weapons;

— at the part of the command: »**single (burst)**« — all the soldiers set the fire selector as commanded;

— at the part of the command: »**with three short (five each)**« — all the soldiers bring their weapons to the shoulder joint aiming at the target, and

— at the part of the command: »**FIRE!**« — they fire the number of rounds (bursts) commanded.

Having fired the specified number of rounds (bursts) the soldiers bring their weapons down from the shoulders and carefully observe the target (battlefield).

181. Firing squad may produce rapid fire and salvo.

A squad armed with automatic rifles must be given a command with specified type of fire. For rapid fire at short distances the command will be: »Squad, rapid — FIRE!«. If the command does not specify the number of rounds (bursts), firing will not be ceased until the target is destroyed (disappeared) or the command »CEASE FIRE!« given.

182. When fire commences with one salvo the procedure is as given under item 181. When several salvos are commanded, after the first and subsequent salvos the soldiers do not bring their weapons down from the shoulders but continue to aim carefully in order to fire the next salvo. It is only after the last salvo is fired, that the weapons are brought down from the shoulder.

When the squad commences fire with salvo the light machine gunner at the part of the command: »**FIRE**« fires one shot or a short burst if commanded so by the officer.

183. Beginning of fire commence is specified by the command »**FIRE!**«, whereas if fire commences at own initiative it is up to the shooter — gunner himself. Fire should commence in the most convenient moment: when the target can be destroyed suddenly, when the target is easily noticeable, and when it is a group target, its flank not covered or when it climbs after action.

184. To cease fire the command »**CEASE FIRE!**« or a known signal is given, and to stop firing the command is »**CEASE FIRE — UNLOAD!**«

185. Soldiers may fire with the weapons from the right or left shoulder as it suits them. When firing with rifles always try to find a suitable rest for them.

186. Automatic rifles are loaded by 30-round magazines and light machine guns by 30-round magazines or 75-round drums as follows: insert the magazine (drum) into the receiver slot tilting it slightly forward, then pull it toward yourself so that

the magazine catch is engaged with the magazine lug. In order to chamber a round it is necessary to pull the bolt fully back and to release it abruptly forward.

If fire will not commence soon, the weapon must be brought into safe position.



Fig. 72a — Loading of magazine

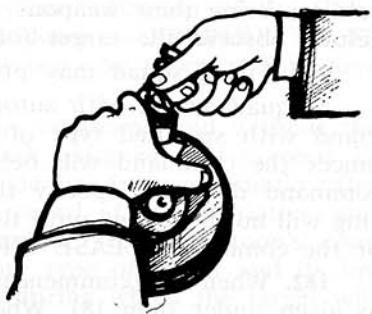


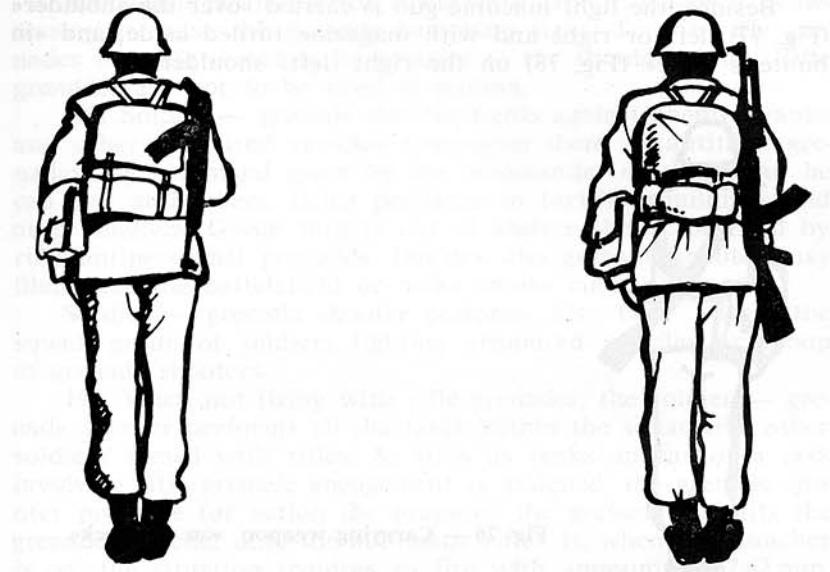
Fig. 72b — Loading of drum

Fig. 72a — Loading of magazine

187. To load the magazine with rounds take it in the left hand (Fig. 72a) with cartridge follower up. Insert rounds by the right hand placing their bottoms into magazine lips, press down and forward (toward the magazine rear side).

To load the drum take it in the left hand with cartridge mouthpiece turned up and cover outward. Holding the drum by the left hand, thumb on the loading handle lug, and other fingers around the drum near the cartridge mouthpiece (Fig. 72 b), take rounds in the right hand in such a manner that bullets are directed to the little finger. By the thumb of the left hand move the loading handle anticlockwise, push the round under the cartridge retainer by the right hand and release the loading handle. Proceed with loading operation in the same manner until the drum is full.

188. The weapon is carried »on the right shoulder« (Fig. 73) or in the right (left) hand (Fig. 74), »on the chest« (Fig. 75) and »on the back« (Fig. 76).



a) Automatic rifle  
M70AB2,

b) Light machine gun

Fig. 73 — Carrying the weapon on the right shoulder



Fig. 74 — Carrying the weapon  
in hand



Fig. 75 — Carrying the weapon  
»on the chest«

Besides, the light machine gun is carried »over the shoulder« (Fig. 77), left or right and with magazine turned aside, and »in hunter's style« (Fig. 78) on the right (left) shoulder.



Fig. 76 — Carrying weapon »on the back«



Fig. 77 — Carrying the LMG »over the shoulder«



Fig. 78 — Carrying the LMG »in hunter's style«

189. When preparing for firing with rifle grenades it is necessary to raise the grenade launching sight. To fire rifle grenades the rifle is not to be brought to the shoulder joint. Rifle grenades are not to be fired in motion.

190. Soldier — grenade shooter fights against enemy's tanks and other armoured vehicles destroying them by antitank grenades. By command given by the commander of the squad he can fire at bunkers, firing positions in fortified buildings and other shelters. Group targets out of shelter should be fired by rifle antipersonnel grenades. Besides, the grenade shooter may illuminate the battlefield or make smoke curtains.

Soldier — grenade shooter performs his task within the squad, group of soldiers fighting armoured vehicles or group of grenade shooters.

191. When not firing with rifle grenades, the soldier — grenade shooter performs all the tasks within the squad like other soldiers armed with rifles. As soon as tanks appear or a task involving rifle grenade engagement is assigned, the grenade shooter prepares for action (he prepares the grenade and fits the grenade launcher onto the automatic rifle). If, when the launcher is on, the situation requires to fire with ammunition 7,62 mm, the grenade shooter opens fire without removing the launcher from the automatic rifle.

192. The command for fire commence is: »At tank, by antitank, 100 FIRE!« or »Slantly right, armoured vehicle, by antitank, 150, two figures in front — FIRE, or »Straight at infantry, by antipersonnel, 200 — FIRE!«.

If there is no need for all the soldiers to fire with rifle grenades, the commander of the squad appoints the soldiers to fire and commands them.

## 2. PREPARATION FOR FIRING

### 1) FIRING POSITIONS

#### (1) LYING POSITION

193. Position for firing with an automatic rifle is to be taken by command or by own initiative. When the command »lie down—prepare to fire!« is given, the soldier takes the rifle by the handguard in his right hand, making one longest possible step slantly forward to the right by his right leg, at the same time he stret-

ches out his left arm, puts his palm on the ground and lies down supporting himself by his left knee, hip and left elbow; at the same time he extends his right leg and throws the rifle forward gripping it by the lower part of handgrip with his left hand, he unlocks the rifle, pulls the bolt into rear position and releases it forward, taking the position »prepare to fire«.

In the position »prepare to fire« the rifle is held by the handgrip with the right hand, the left hand is on the handguard, stock rests upon the ground and muzzle at the height of soldier's

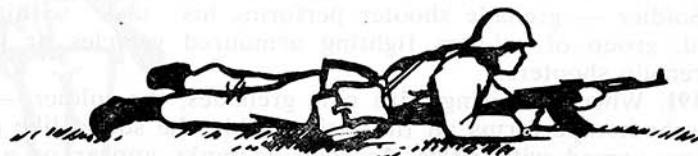


Fig. 79 — Position »LIE DOWN-PREPARE TO FIRE« with AR

eyes (Fig. 79). The legs are spread and the right knee may be slightly bent (if more convenient), while the soldier looks at the target over the barrel.

Lying position is most convenient when the body is positioned slantly 12°—20° in relation to direction of firing. In this position there is enough room for the chest and breathing is easier; besides, it makes possible to lean the cheek properly upon the stock cheekpiece and to bring the stock plate to the shoulder joint. The soldier should lie slightly turned to his left hip.

When the shooter fires without a rest, his left elbow should be positioned vertically under the rifle.

**194.** When the command »Lie down — PREPARE TO FIRE!« is given, the gunner tilts the light machine gun toward the middle of the body by his right hand releasing and extending the bipod by his left hand; he makes one step forward by his left leg and places the light machine gun by its bipod upon the ground; he makes one step back by his left leg; at the same time he places his palms down at both sides of the light machine gun aligned with stock and supported by the palms he quickly throws body back and takes lying position behind the light machine gun.

When the lying position has been taken, the gunner holds the light machine gun by the stock in his left hand while his right arm is bent, palm on the ground nearby the stock (Fig. 80).

**195.** Before taking lying position with automatic rifle and light machine gun with folding stock the procedure is the same as described under items 193 and 194, the only difference being that the soldier (when the rifle is carried »on the right shoulder«) at the same time when making one step forward pulls the sling forward and upward by his right hand and brings the rifle into position in front of his chest, takes it by the magazine by his left hand, takes the rifle off from the shoulder, transfers it into his right hand gripping it by the handguard, lies down, brings the rifle forward and takes it by the handguard in his left hand, the magazine turned to the left; by his right hand thumb he pushes the stock fixing mechanism, extends the stock and shoulder support.

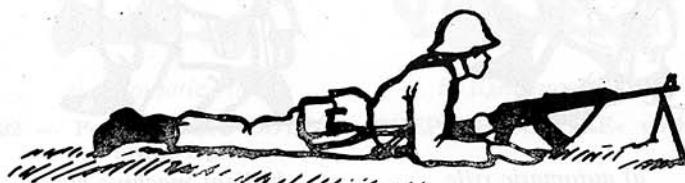


Fig. 80 — Position »LIE DOWN-PREPARE TO FIRE« with LMG

When the automatic rifle is »on the chest«, at the same time when making one step forward the soldier grips the magazine by his left hand, lifts the rifle up simultaneously taking the sling off from the neck, transfers the rifle into his right hand (gripping it by the handguard) and proceeds as described above.

## (2) KNEELING POSITION

**196.** At the command »Kneel down — PREPARE TO FIRE!« the soldier makes one step forward by his left leg, kneels down immediately on his right knee and sits on the calf of his right leg, or just leans upon the heel (if more convenient), at the same time he throws the weapon forward by the right hand gripping it by the handguard with his left hand; he leans his elbow or upper arm against his left knee or thigh, then he unlocks the rifle or light machine gun and pulls the bolt abruptly back and releases it into forward position.

In the position »prepare to fire« (Fig. 81) the left heel is aligned with the right knee — moved left by one foot, the left lower leg in vertical position if possible, upper part of the body slightly tilted forward and head up looking at the target.

In kneeling position the bipod of light machine gun should not be extended. The weapon is held with the right hand on the handgrip, and the left one on the handguard leaning against the left thigh.



a) automatic rifle  
M70B1,

b) light machine gun

Fig. 81 — Position »KNEEL DOWN—PREPARE TO FIRE«

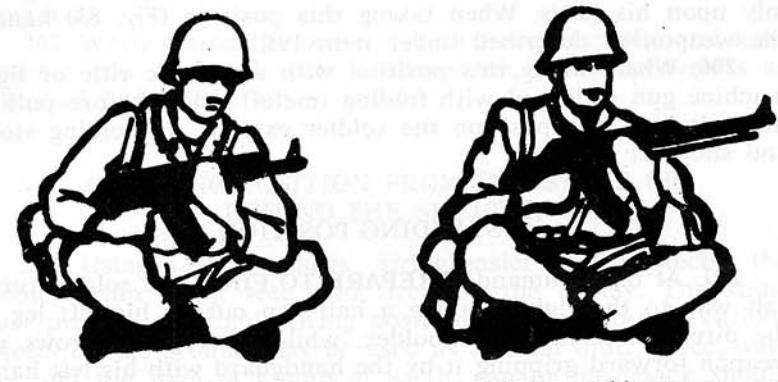
Stability of kneeling position depends, above all, upon proper distribution of supporting points — left foot, right knee and top of right foot toes. The most stable position is the one in which the supporting points form a triangle.

The left leg should be moved half a step forward bending it so that the lower leg is approximately in vertical position. Body weight should be uniformly distributed to all the three supporting points.

**197.** When taking the kneeling position with automatic rifles and light machine guns equipped with folding (metal) stock and when the weapon is carried »on the right shoulder«, the procedure is as described under item 196, the only difference being that before throwing the weapon forward the soldier has to extend the folding stock and shoulder support as described under item 195.

### (3) SITTING POSITION

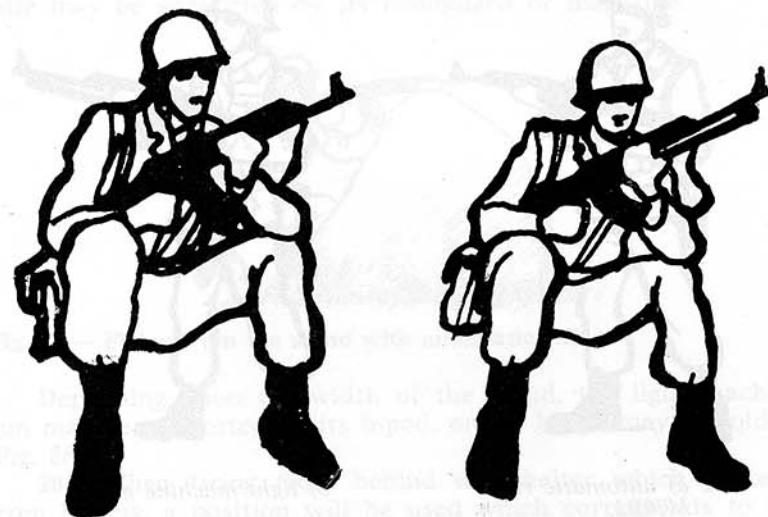
**198.** At the command »Sit down — PREPARE TO FIRE!« the soldier crosses his legs and sits upon the ground placing his right foot under his left thigh or placing his left foot under



a) automatic rifle,

b) light machine gun

Fig. 82 — Position »SIT DOWN — PREPARE TO FIRE« with crossed lower legs



a) automatic rifle

b) light machine gun

Fig. 83 — Position »SIT DOWN — PREPARE TO FIRE« with heels resting upon the ground

his right thigh, he leans his left forearm against his left thigh gripping the handguard (Fig. 82); he unlocks the automatic rifle or light machine gun, holds the bolt by his right hand, pulls it back and releases it forward abruptly.

199. If sitting position is to be taken on a slope, the soldier sits upon the ground turned half-way to the target resting firmly upon his heels. When taking this position (Fig. 83) handle the weapon as described under item 198.

200. When taking this position with automatic rifle or light machine gun equipped with folding (metal) stock, before pulling the bolt into rear position the soldier extends the folding stock and shoulder support.

#### (4) STANDING POSITION

201. At the command »PREPARE TO FIRE« the soldier turns half way to the right, making a half-step out by his left leg in the direction of his left shoulder; while turning, he throws the weapon forward gripping it by the handguard with his left hand, the sling is between his arm and body; then he unlocks the automatic rifle or light machine gun, he takes hold of the bolt, pulls it back and releases it forward abruptly.



Fig. 84 — Position »PREPARE TO FIRE«

In the position »prepare to fire« (Fig. 84) the body is slightly tilted forward, body weight is distributed uniformly to both feet; knees naturally stretched, head up, looking at the target, left hand holds the weapon by the handguard while the right one is on the handgrip, the weapon turned sights up. In this position, the bipod of the light machine gun should not be extended.

202. When taking the position with automatic rifle and light machine gun equipped with folding stock, the procedure is as described under item 195.

#### (5) FIRING POSITION FROM THE STAND OR BEHIND THE SHELTER

203. Using a stand makes firing easier and protects the shooter from being seen and fired by the enemy. The stand must provide a suitable firing position for the shooter. Various objects on the ground may be used as a stand (butt, fence, wall, tree and the like). A clump of earth, cap or haversack should be placed upon a hard stand.

When firing from the stand the shooter is allowed to hold the rifle by his left (right) hand, arm resting upon the stand (Fig. 85). Depending on the width of the stand, the automatic rifle may be supported by its handguard or magazine.



Fig. 85 — Firing from the stand with automatic rifle

Depending upon the width of the stand, the light machine gun may be supported by its bipod, or the bipod may be folded. (Fig. 86).

204. When firing from behind the shelter which protects from bullets, a position will be used which corresponds to the height of the shelter.

When firing from behind a shelter which protects only from enemy's observation, the lowest firing position possible should be used.

When firing over a wall or embankment the weapon should lean from above and when firing over a butt the elbows must rest upon the butt.



Fig. 86 — Firing from the stand with light machine gun supported by its bipod

If the shelter is not high enough for the position specified but is shorter, instead of bending your back to adapt yourself to its height, stand astride (Fig. 87) which is a less tiring and more stable position for firing.



Fig. 87 — Position »PREPARE TO FIRE« suited to the height of shelter

205. If the soldier fires from behind shelter, in kneeling or standing position (Fig. 88), he leans his left side of body and shoulder firmly against the shelter, withdrawing his right shoulder and taking care not to touch the stand (shelter) by the weapon and his left (right) hand in order to avoid lateral deflection of bullet.



a) with automatic rifle



b) with light machine gun

Fig. 88 — Firing from behind a shelter

When firing with light machine gun from behind a shelter always use the bipod.

206. In firing with light machine gun from the bipod when there is a stand for the bipod but not for elbows (firing out of the window, from attic, wall and the like), place it upon the bipod and apply a firing position corresponding to the height of shelter.

207. When firing from a tree, the soldier must choose such a place which will provide for stable position of his body, shelter and stand for the weapon (Fig. 89).



Fig. 89 — Taking position for firing from the tree

208. When firing from a vehicle (armoured vehicle and landing vehicle) any firing position may be applied using a stand (Fig. 90). As a stand for arms, shoulders and LMG bipod use benches, bench backs or any other suitable supports inside the vehicle (armoured vehicle). Bipod of the light machine gun may be folded but always put a cap, haversack or the like under it. The weapon must be positioned for firing in such a way that nothing disturbs normal movement of the bolt handle.



a) resting upon the cab



b) supporting the light machine gun by its bipod

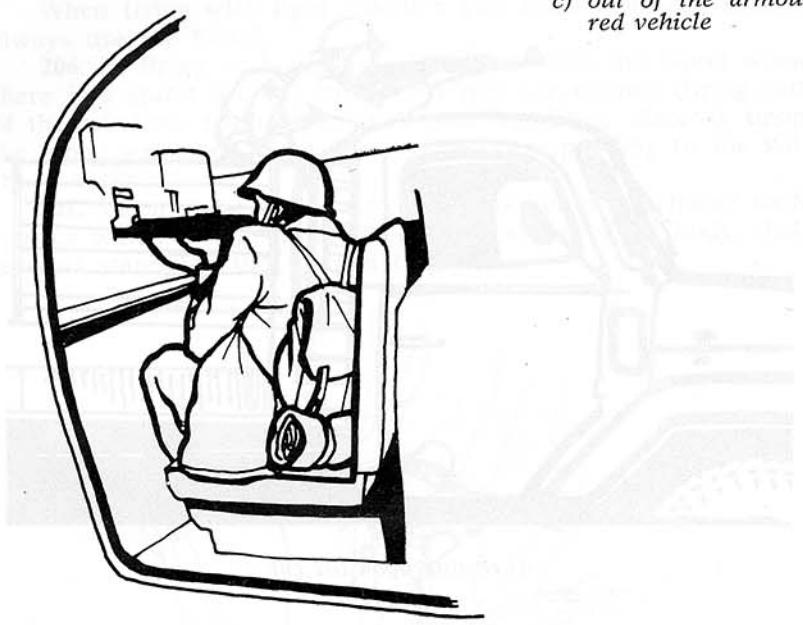


Fig. 90 — Firing from or out of the vehicle

#### (6) FIRING POSITIONS FROM SKIS

209. When on skis, the soldier carries the weapon on his chest or on his back since the hands must be free to hold the poles.

All firing positions (in training) are to be taken from the position »attention« on skis. In all the positions the poles can

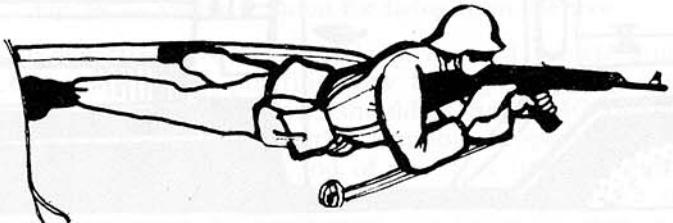


Fig. 91 — Lying position with elbows on ski poles

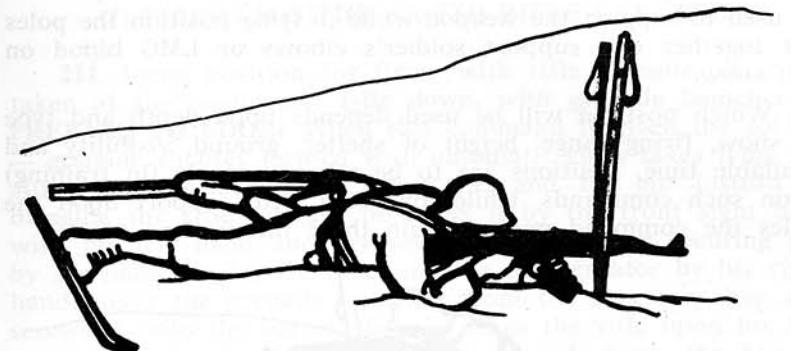


Fig. 92 — Lying position using the poles as a stand for the rifle

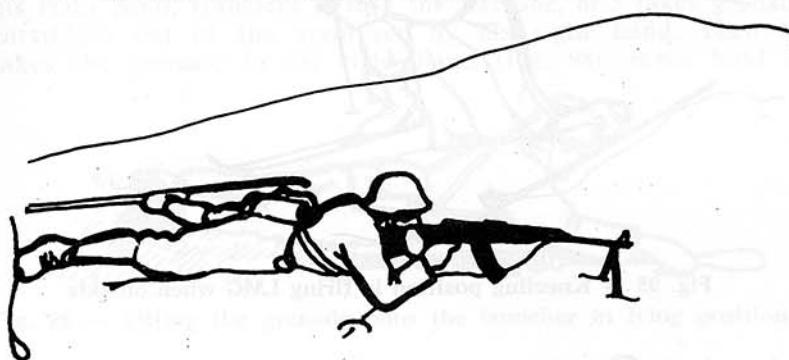


Fig. 93 — Lying position in firing LMG when on skis



Fig. 94 — Kneeling position in firing AR with one ski turned aside

be used to support the weapon while in lying position the poles put together can support soldier's elbows or LMG bipod on soft snow.

Which position will be used depends upon depth and type of snow, firing range, height of shelter, ground, visibility and available time. Positions are to be taken properly (in training) upon such commands, while for firing with support upon the poles the command must contain these instructions too.



Fig. 95 — Kneeling position in firing LMG when on skis

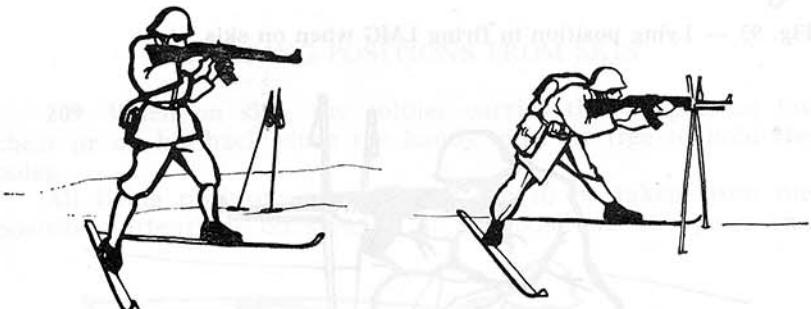


Fig. 96 — Position »PREPARE TO FIRE« when on skis

Fig. 97 — Using ski poles for supporting during firing

210. When on skis it is possible to use lying, kneeling and standing position; it is also possible to fire in motion (see Figures 91—97).

## (7) FIRING POSITIONS WITH RIFLE GRENADES

211. Lying position for firing with rifle grenades is to be taken at the command **»lie down, with grenade launcher — PREPARE TO FIRE!«** When this command is given the soldier — grenade shooter (armed with automatic rifle) takes lying position as described under items 193 and 195 but instead of bringing the rifle forward he holds it by the front sight base with his left hand and presses the compensator securing pin by his index finger. He takes off the compensator by his right hand, takes the grenade launcher from the accessory bag and screws it onto the barrel, then he leans the rifle upon his left arm above the hand. He takes the grenade from the bag by his right hand, transfers it into the left one, and takes grenade cartridges out of the stabilizer by his right hand. Then he takes the grenade in his right hand (Fig. 98), takes hold of

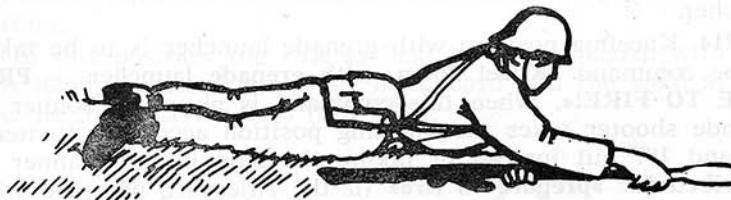


Fig. 98 — Fitting the grenade onto the launcher in lying position

the rifle by his left hand and fits the grenade onto the launcher by the right one until the stabilizer bottom strikes against the face of the launcher (it means that the stabilizer has overcome the grenade fixing spring). After that, he takes off (by screwing off) the transport safety of the grenade and raises the grenade launching sight.

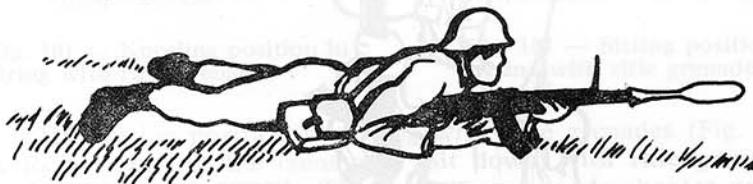


Fig. 99 — Lying position in firing with rifle grenades

Now the soldier takes the grenade cartridge in his left hand extracting it from the polyvinyl bag by his right hand, takes off the magazine, load it with the grenade cartridge and

fits the magazine to the rifle, then he brings the rifle forward, puts the sling on his upper arm — near the shoulder (Fig. 99), unlocks the rifle, pulls the bolt back and releases it forward. He leans his right elbow upon the ground, places his index finger on the trigger leaving some space between the hand and rifle while holding the handguard by his left hand near the rear sight. In this position the sight is at the same height with his eyes.

**212.** In case of the rifles with folding stock there is no need to extend the shoulder support in lying position. Do not lean the stock and magazine of the rifle against the ground or any objects since they will get deformed.

**213.** If the soldier — grenade shooter has an assistant, the procedure for taking the lying position is according to item 211, the only difference being that the assistant who lies down on the right side prepares the grenade and fits it onto the launcher.

**214.** Kneeling position with grenade launcher is to be taken at the command »**Kneel down, with grenade launcher — PREPARE TO FIRE!**«. When this command is given the soldier — grenade shooter takes the kneeling position according to items 196 and 197 but instead of taking the rifle in the manner as described for »**prepare to fire**« (if the rifles are provided with folding stock not extending the shoulder support), he brings it



Fig. 100 — Fitting the grenade onto the launcher in kneeling position

in front of his body, leaning the stock upon the ground; he takes off the compensator, takes the grenade launcher out of the bag and fits it onto the barrel (if not already fitted); he leans the rifle upon the curve of the left arm elbow, takes the grenade from the bag by his right hand and transfers it into the left one and takes the grenade cartridges out of stabilizer and put them down.

After that, he takes the rifle by the handguard with his right hand and fits the grenade onto the launcher (Fig. 100), screws off the transport safety; again leaning the rifle against the curve of his left arm elbow, he takes the grenade cartridge out of its polyvinyl bag.

Now he removes the magazine from the rifle, loads it with the grenade cartridge and inserts it into the receiver; then, he raises the grenade launching sight, puts the sling on his left arm elbow, pulls the bolt back and releases it abruptly into front position.

In this position the rifle is held by the handgrip with the right hand, the left one on the handguard and the sight at the same height with the eyes (Fig. 101).

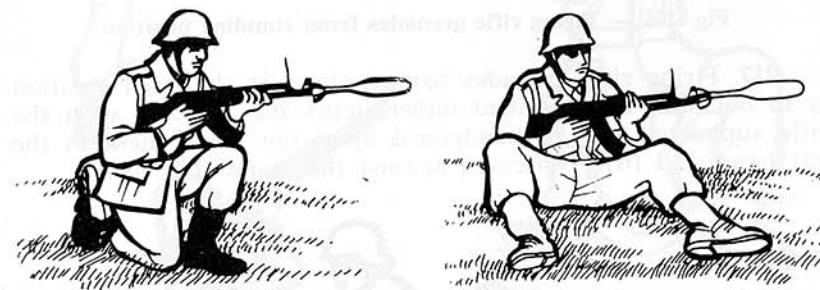


Fig. 101 — Kneeling position in firing with rifle grenade

Fig. 102 — Sitting position in firing with rifle grenades

**215.** Sitting position for firing with rifle grenades (Fig. 102) is to be taken at the command »**Sit down, with rifle grenades — PREPARE TO FIRE!**«. The soldier — grenade shooter proceeds and handles the rifle as described under item 214.

**216.** Standing position for firing with rifle grenades is to be taken at the command »**With grenade launcher — PREPARE TO FIRE!**«.

In standing position the rifle is held by the handgrip in the right hand while the left hand passed between the sling and rifle holds the handguard (Fig. 103).



Fig. 103 — Firing rifle grenades from standing position

217. Firing rifle grenades from a stand in sheltered position is to be made as described under items 203 and 207, with the rifle supported by the handguard upon the stand, held in the left hand and firmly pressed against the stand (Fig. 104).



Fig. 104 — Firing with rifle grenades from the stand

In case of a firm stand (stone, iron and the like), place a soft object above (cap, clump of earth, haversack) in order to protect the handguard.

Leaning the stock upon a stone or other hard objects is not allowed lest the rifle should get damaged.

#### (8) POSITIONS FOR FIRING AT AIR TARGETS

218. Depending upon situations, positions for firing at air targets may be: standing (Fig. 105), kneeling (Fig. 106), sitting (Fig. 107), lying (Fig. 108), on bare ground and from sheltered positions (Fig. 109), from a stand (Fig. 110), and off one's hand. Which position will a soldier choose depends upon his skill, combat situation and suitability of objects on the ground.

Fig. 105 — Standing position for firing at air targets

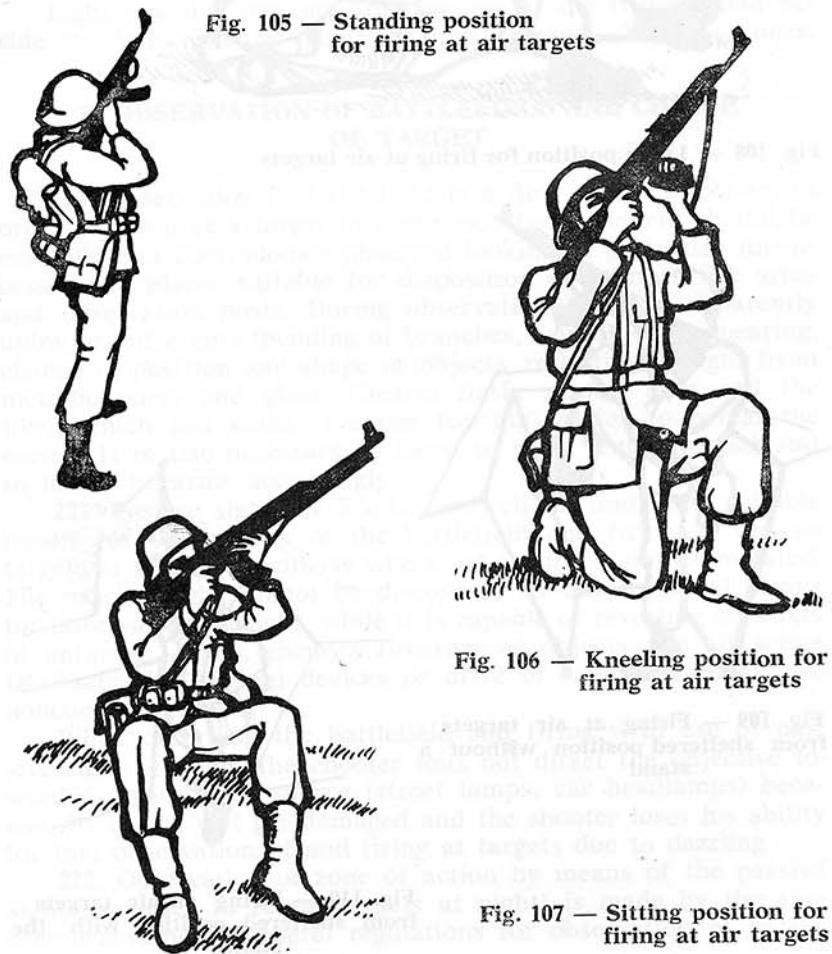


Fig. 106 — Kneeling position for firing at air targets

Fig. 107 — Sitting position for firing at air targets



Fig. 108 — Lying position for firing at air targets

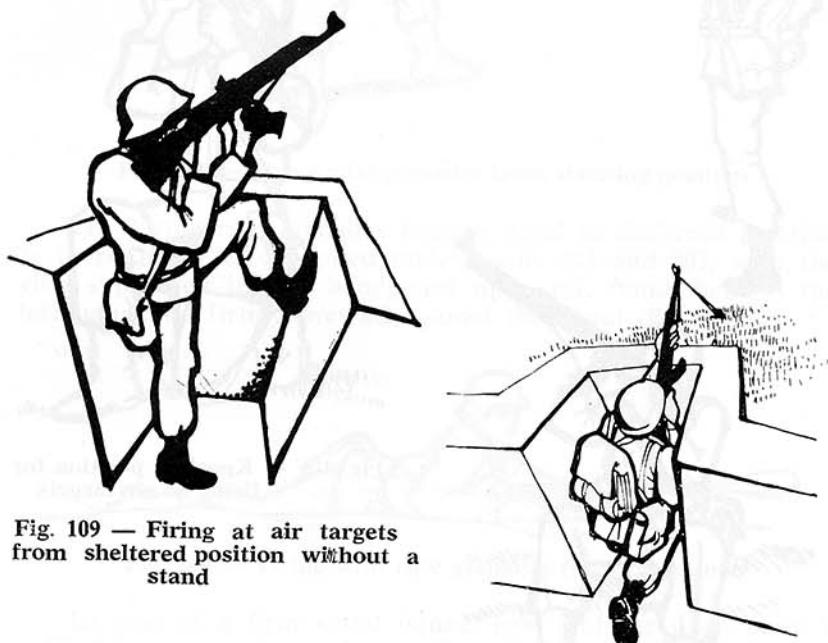


Fig. 109 — Firing at air targets from sheltered position without a stand

Fig. 110 — Firing at air targets from sheltered position with the stand

## (9) CHOICE OF PLACE AND FIRING POSITION

**219.** Each soldier must choose a place for sheltering unless already assigned to him. The place for firing must provide for: good observation of the battlefield; firing at ranges not shorter than 400 m or 800 m for light machine guns; fast digging in, or protection against enemy's fire; masking against observation from the ground or air, mutual fire support with adjacent soldiers and hidden accesses which enable change of position and supply with ammunition.

Light machine gun on fire position of the firing squad beside the basic shelter (position) must have 1—2 reserve ones.

## 2) OBSERVATION OF BATTLEFIELD AND CHOICE OF TARGET

**220.** Observation of battlefield is a duty of each soldier. In order to discover a target in due time, the battlefield should be carefully and continuously observed looking in particular for accesses and places suitable for disposition of enemy's fire arms and observation posts. During observation look for apparently unimportant events (bending of branches, new objects appearing, change of position and shape of objects, reflection of light from metallic parts and glass, firearm flash, smoke, dust and the like), which can make it easier for the soldier to reveal the enemy. It is also necessary to listen to shots (engine noise) and to locate firearms accordingly.

**221.** Passive sight PN 5 × 80 is a reliable and most suitable means for observation of the battlefield and firing at various targets at night, particularly where the ground is not illuminated. The passive sight cannot be discovered by any technical means for observation at night, while it is capable of revealing all kinds of animate targets, enemy's firearms or objects and all active IR-observation (firing) devices or drive of enemy's combat and noncombat vehicles.

When observing the battlefield and firing with use of passive sight at night, the shooter must not direct the objective toward a strong light source (street lamps, car headlamps) because the device will get damaged and the shooter loses his ability for fast observation of and firing at targets due to dazzling.

**222.** Observation of zone of action by means of the passive sight (in order to reveal targets at night) is made by the shooter according to general regulations for observation of battle-

TABLE 4

Distance in meters	What can be seen
100	It is hard to distinguish a foot soldier from a horseman
800 to 700	It is possible to see movements of a foot soldier who walks or runs
400 to 300	It is possible to distinguish colours (face, clothing, shoes)
200	It is possible to distinguish contours of man's head and shoulders
150	It is possible to see man's hands and parts of weapon and clothing

Under conditions of limited visibility (night, fog, smoke), determination of distance to the target — object is much more difficult. Table 2 shows how to determine distance under limited visibility.

TABLE 5

Can be seen at night	Distance in meters	Can be heard at night	Distance in meters
Flash of light machine gun fire	2000	Shot of a rifle	3000
Light of a lamp	2000	Tanks in movement	1500 to 800
Illuminated dust	1000	Animal-drawn artillery in movement	600 to 500
Flame of a match	300	Truck in movement	500 to 300
Group of soldiers in moonlight	300 to 200	Careless bolt opening	400
A lit cigarette	100 to 50	Rattling of equipment	300
Group of soldiers in a dark night	70 to 50	Loud talk	200
Group of soldiers in heavy darkness	15 to 10	Movement on hard grounds and dry leaves	200

field. In doing this, the shooter must not use the sight too long since this makes his eyes tired and unnecessarily consumes energy from the battery. While observing at night the shooter uses also his senses (of sight, hearing, smell) and his personal instinct. As soon as he notices or feels an activity of the enemy he proceeds observing with the passive sight in order to discover a target.

**223.** A target is to be chosen by the soldier himself or is assigned to him by the commander. The shooter fires at enemy's commanders, individual soldiers uncovered or badly protected, those who run across or appear suddenly.

Light machine gunner fires at weapon operators, group of shooters, important single targets (commander, messenger, observer), automobiles, motorcyclists, bunker loopholes, etc.

If during fire a more important or dangerous target appears the soldier is obliged to transfer fire to it.

**224.** A target to be fired with rifle grenades is to be chosen by the commander of the squad, and if fire commences at own initiative by the soldier — grenade shooter. When choosing a target be careful to choose the one which is the most important and most suitable for firing at that time.

If several targets appear at approximately the same distance at the same time choose the active one.

### 3) DETERMINATION OF DISTANCE TO THE TARGET

**225.** The most important prerequisite for successful firing is accurately determined distance to the target. The soldier can estimate target range by visual estimate, by measurement and by angular size of a known object.

#### (1) VISUAL ESTIMATE

**226.** Visual estimate is the basic method for determination of target range judging by appearance, visibility and colour of the target or object, by transferring a known base on the ground, or by a combination of these two methods.

**227.** To determine distance by appearance, visibility and colour of the target or object, the soldier makes his own memo where he enters his observations on objects and targets at various distances. Possibility for identification of targets at various distances for normal eyesight under favourable conditions (nice weather, good illumination and the like) is shown in Table 4.

**228. Determination of distance by transferring a known base** is to be made according to a memorized known distance which serves as the known base.

To determine distance the base is to be transferred as many times as necessary to cover the distance to be found (Fig. 111), bearing in mind the following:

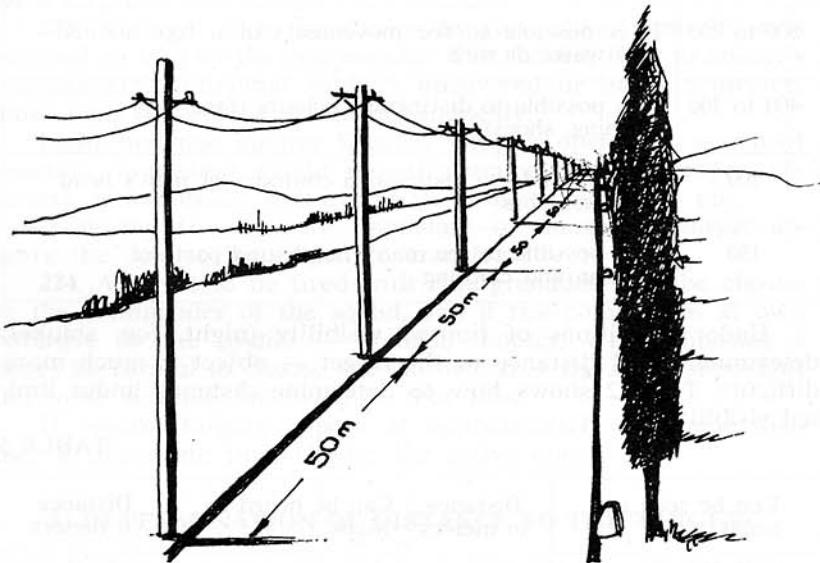


Fig. 111 — Determination of distance by transferring a known base

— length of a known base looks longer when closer to you, and vice versa, and

— valleys, depressions, ravines, streams and the like crossing the direction in which the distance is being estimated (if not visible or hardly visible) apparently reduce the distance.

Ability for visual estimate of the distance accurately and rapidly may be attained only by continuous and permanent exercise.

## (2) DIRECT MEASUREMENT

**229. Direct measurement** allows for determination of the distance by means of a meter, picket, elastic tape, rope, and steps of known length.

## (3) ESTIMATE BY ANGULAR SIZE OF A KNOWN OBJECT

**230.** In order to determine distance in this manner it is necessary to know exactly the height or width of an object (target) whose distance is to be found. Angular size of the object is to be measured in mils and then the distance is calculated

$$D = \frac{V(S) \times 1000}{U}$$

according to the formula  $D = \frac{V(S) \times 1000}{U}$  where  $D$  = distance,

$V(S)$  = height (width) of the object, 1000 = constant coefficient,  $U$  = angular size of the object in mils.

Angular sizes of objects are to be measured by means of windage scale, binoculars, fingers or other means of known dimensions (Fig. 112).

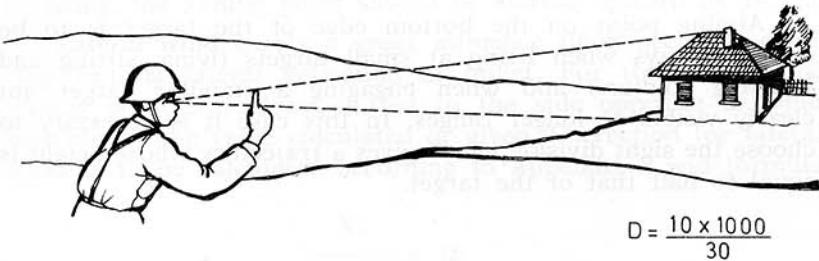


Fig. 112 — Measurement of angular size of the object by fingers

Some local objects are of approximately standard size: telegraph pole is 8 m high, long-distance power line pole is 20–25 high, single-floor village house is 7–8 m high, door of a house is approximately 2 m high, average height of a soldier is 1.75 m, tank is about 6 m long and 3 m wide, and so on.

**Example:** Height of a single-floor house can be covered by the width of a match box edge (70 mils). Distance to the house is

$$100 \text{ m} \left( \frac{7 \times 1000}{70} \right) = 100$$

When estimating the distance by means of binoculars, the angular size can be read directly on its reticle.

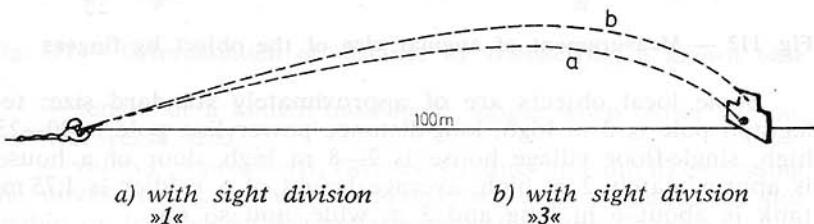
#### 4) CHOICE OF SIGHT AND AIMING POINT

**231.** Determination of height of sight division (division of windage scale too in case of LMG) depends upon target range and factors which have effects upon bullet range and its direction of flight (wind, temperature). In principle, the aiming point is the target centre.

**232.** Sight division (windage scale division) and aiming point are determined in such a manner that mean trajectory passes through the target centre. When firing at tall targets (standing soldier) at short ranges, the aiming point is to be chosen in the widest part of the target (chest, stomach).

**233.** Sight division is generally chosen according to estimated target range, for example: to fire at a target at 400 m — sight division 4. In this case, when the target is tall, the aiming point is the target centre.

Aiming point on the bottom edge of the target is to be chosen always when firing at small targets (lying, sitting and kneeling soldiers) and when engaging a standing target not clearly visible at longer ranges. In this case it is necessary to choose the sight division which gives a trajectory whose height is equal to half that of the target.



a) with sight division  
»1«

b) with sight division  
»3«

Fig. 113 — Choice of aiming point on the target

**Example:** To fire at a target (chest figure) 50 cm high at 100 m, you can choose the aiming point in the target centre when firing with the sight division 1 (Fig. 113), or you can choose the aiming point in the middle of the target bottom edge and use the sight division 3 since in this case trajectories rise by 25 cm and accordingly a shot in the target centre may be expected.

**234.** When firing at ranges longer than 500 m influence of temperature and longitudinal wind is to be taken into account and the aiming point is to be shifted as follows: in case of cold weather or strong wind blowing opposite to direction of firing — the aiming point is shifted upward; in case of hot weather or wind blowing in direction of firing — the aiming point is to be shifted downward. Amount of correction of the aiming point is given in Appendix 5.

**Example:** Light machine gun fires at the range of 600 m, longitudinal wind, speed 15 m/s, blowing in direction of firing. Correction for wind speed 10 m/s is 0,16, and for wind speed 15 m/s it will be 0,24 ( $0,16 \times 15 = 2,40 : 10 = 0,24$ ). Since the wind blows in direction of firing the result will be an overshoot by 24 cm and therefore the aiming point should be shifted downward by this amount. If the wind is opposite to direction of firing, the aiming point should be shifted upward by 24 cm.

**Lateral wind** exerts a great influence upon accuracy of firing causing lateral deflection of bullet. For this reason the aiming point should be shifted to the side opposite to wind blowing by the value calculated or given. Correction for lateral wind is to be calculated according to Appendix 5 and formula

$$\frac{Vs}{Vt} \times tp$$

where  $Vs$  = measured wind speed  
 $Vt$  = table wind speed (10 m/s)  
 $tp$  = table correction for  $Vt$

**Example:** Firing at the range of 400 m, lateral wind, speed 6 m/s, blowing at the angle of 90°. Correction for automatic rifle (Appendix 5) for wind speed 10 m/s is 2,32 m or 4,9 figures, and for wind speed 6 m/s it will be 1,39 m or 2,5 figures ( $2,32 : 10 = 0,232 \times 1,39$  m).

**235.** If the wind blows at the angle of 30°, the correction is 0,5; for the wind at the angle of 45°, the correction is 0,7; for the wind at the angle of 60°, the correction is 0,9 of the correction given or calculated for the wind at the angle of 90°.

**Example:** If the correction for the wind at the angle of 90°, speed of 6 m/s and at the range of 400 m (with automatic rifle) is 1,39 m, for the wind of the same speed at the angle of 30° it will be 0,69 m ( $1,39 \times 0,5 = 0,69$  m).

**236.** Choice of windage scale division when firing at stationary targets with light machine gun depends upon lateral wind speed and target range. If the wind is stronger and the target is at longer range, the bullet will deviate more from the direction of firing. Correction on the windage scale is to be made to that side the wind is blowing from, for example: wind is blowing from right to left — move the windage scale mark to the right. If influence of lateral wind is to be eliminated by the windage scale, the aiming point is the target centre.

If the correction cannot be made on the windage scale, influence of lateral wind is to be eliminated by transferring the aiming point in target figures or in meters, counting from the target centre.

**237.** In decisive moments of combat at ranges up to 400 m, when there is no time to bring the slide to the division corresponding to the target range, the slide is to be pulled into its rearmost position (division »0«) on the leaf. This gives the angle of sight as with the division »3«. In this case the aiming point is to be chosen according to firing range and target size:

- at distances above 300 m the aiming point is the highest point on the target;
- at distances up to 300 m the aiming point is the target bottom (in case of lying, sitting and kneeling targets) or the target centre in case of running or standing target.

## 5) COMMENCE FIRE

**238. Sight division is to be set** at the command or according to estimated target range when the soldier commences fire at his own initiative.

**239. Soldier brings the rifle to his shoulder joint** lifting it with his both hands while observing the target constantly. The stock must lean against the shoulder joint without applying force.

The soldier holds up his head to provide for most favourable conditions for his eye in aiming. His head should not be tilted to the right or downward lest he should look askew or »from below his forehead«. His right cheek should not be pressed to the cheekpiece of the stock. Excessive tension of muscles on his neck will cause trembling of the head which results in more difficult aiming and disturbed stability of the weapon.

In lying position the rifle should not be pushed forward by the right hand and shoulder; instead, it must be pressed tightly to the shoulder joint by the right arm.

**240. For proper aiming, soldier's eye, rear sight, front sight top and the target must follow the same straight line.** In aiming it is necessary to bring the front sight into the centre of the aiming slot; align its top with the top edge of the rear sight provided with the slot and aim them aligned in this manner at the aiming point (Fig. 114). The most important thing is to achieve uniformity of aiming.

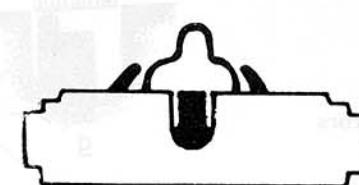


Fig. 114 — Proper position of front sight in the aiming slot while aiming at the target

It is important to leave correct and same space between the front sight and edges of the slot at both sides of the front sight.

**241.** Failing to obey the basic rules in aiming will result in errors shown in Table 6 and on Fig. 115.

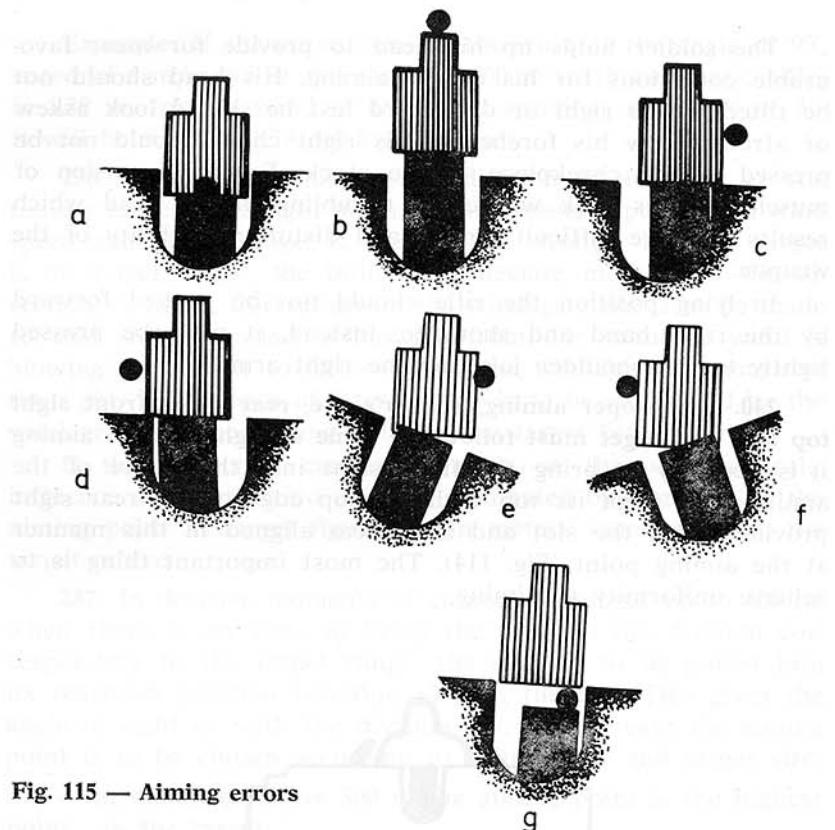


Fig. 115 — Aiming errors

TABLE 6

Aiming error	Deviation of shot	Figure 115
Low front sight	Undershoot	a
High front sight	Overshoot	b
Front sight moved to the right	To the right	c
Front sight moved to the left	To the left	d
Rifle turned to the right	To the right and down	e
Rifle turned to the left	To the left and down	f
Combined error	Horizontal and vertical	g

Aiming errors may be caused by varied intensity of daylight, incidence of sun beams on sight and front sight, illumination of target, incidence angle of sun beams on target and weather conditions. Intensive light apparently increases objects and shot-

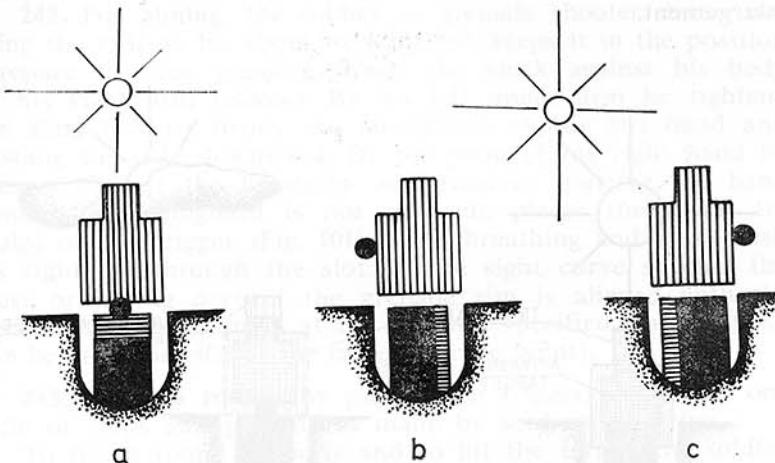


Fig. 116 — Possible aiming errors with illuminated front sight

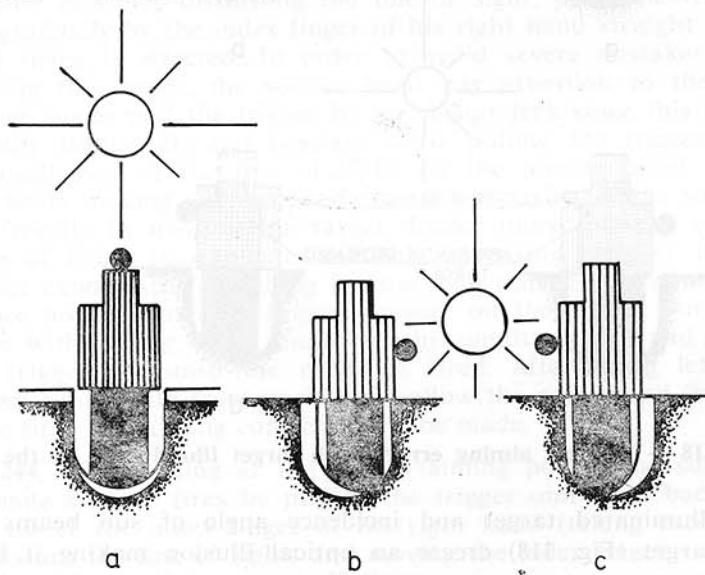
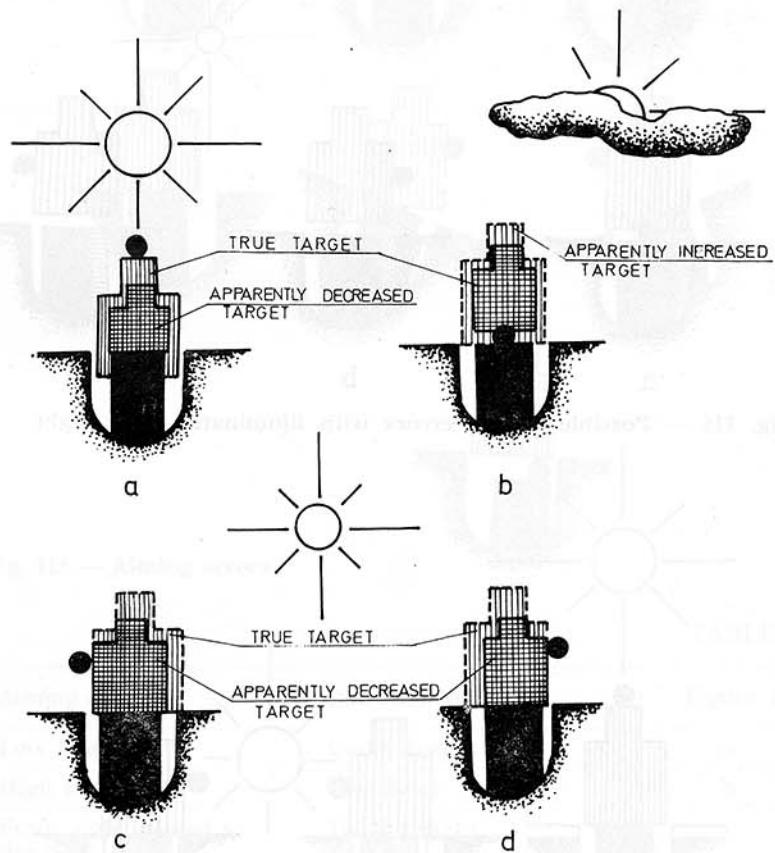


Fig. 117 — Possible aiming errors with illuminated sight

oters move the front sight down into the sight slot which results in undershot and vice versa. Illumination of sight or front sight by sun beams (Figs. 116 and 117) causes reflection of light which distorts true shape thereof and results in apparent enlargement.



**Fig. 118 — Possible aiming errors with target illuminated by the sun**

Illuminated target and incidence angle of sun beams on the target (Fig. 118) create an optical illusion making it look smaller or greater.

Evaporation from the ground and flickering of air during hot summer days distort target shape. To avoid an aiming error, the soldier must choose the aiming point below the target and increase firing range by one division on the sight.

**242. For aiming**, the soldier — grenade shooter does not bring the rifle to his shoulder joint but keeps it in the position »prepare to fire« pressing firmly the stock against his body by his right arm (elbow). By his left upper arm he tightens the sling holding firmly the handguard by his left hand and pushing the rifle downward. By the palm of his right hand he presses against the handgrip and receiver (putting the hand around the handguard is not allowed), places the finger tip (pulp) on the trigger (Fig. 101), stops breathing and looks with his right eye through the slot on the sight curve so that the most projecting part of the grenade rim is aligned with the sight curve when aiming at the distance specified. In this position he aims the rifle at the target (aiming point).

**243. Firing a round** (by pulling the trigger) completes one cycle of steps and procedures made by soldiers in firing.

To fire a round properly and to hit the target, the soldier brings the line of sight to the aiming point, stops breathing for a while and, not disturbing the line of sight, pulls the trigger tail gradually by the index finger of his right hand straight back until firing is effected. In order to avoid severe mistakes and missing the target, the soldier must pay attention to the following: never pull the trigger by an abrupt jerk since this must disturb aiming. Do not hesitate while pulling the trigger due to oscillation of the line of sight on the aiming point since this leads to long aiming, tiredness and annoying of the soldier and results in missing the target. Under more difficult conditions of firing (movable or suddenly appearing targets), if the soldier cannot stop breathing for too long time, he must neither reduce nor increase the finger pressure on the trigger but proceeds with aiming, takes small breaths simultaneously and pulls the trigger tail until the round is fired. After firing let the trigger return into front position to allow the next round (burst) to be fired and aiming corrections to be made.

**244.** After aiming at the target (aiming point), the soldier-grenade shooter fires by pulling the trigger uniformly back by the tip of the index finger of his right hand (taking care not to disturb the line of sight) and moving the index finger rapidly to the right at the moment of firing.

## (1) FIRING AT STATIONARY TARGETS

245. Automatic rifle and light machine gun fire at a single target by short or long bursts depending upon: importance of the target, its size and range. The more dangerous or closer the target is, the longer the bursts must be. Proceed with firing until the target is destroyed or disappears.

Group target consisting of separated, clearly visible figures should be fired with short bursts, gradually transferring fire from one figure to another.

During firing observe bullet fall and, if necessary, change position of aiming point.

## (2) FIRING AT SUDDEN TARGETS

246. In order to hit a target appearing for short time only, it is necessary to make careful observation, to find the target quickly, to determine its range, to choose the sight and aiming point and to commence fire.

In order to commence fire quickly in such a situation use a part of the time foreseen to prepare for fire.

247. To fire at a suddenly appearing target it is necessary to aim in advance at a position where it can be expected, and as soon as it appears aim quickly at it and commence fire.

If it is not possible to locate a suddenly appearing target in advance, it is necessary to fire in »hunter's style« (from the position »prepare to fire« quickly bring the rifle to the shoulder joint, aim and commence fire).

Automatic rifle and light machine gun should fire at sudden targets by short or long bursts.

## (3) FIRING AT MOVABLE TARGETS

248. Movable targets can be classified into three groups: frontal targets moving at angles from 0°—15°; oblique targets moving at angles from 16°—60°, and lateral targets moving at angles from 61°—90° in relation to the direction of firing.

A frontal movable target may be approaching (moving toward fire position), and departing (moving away from fire position).

Frontal movable targets may be fired using the sight division which corresponds to the distance at which the target will

appear at the moment of firing. Aiming point for a frontal approaching target should be chosen on the lower half of the target (below the waist), and for a departing target in the head (Fig. 119).

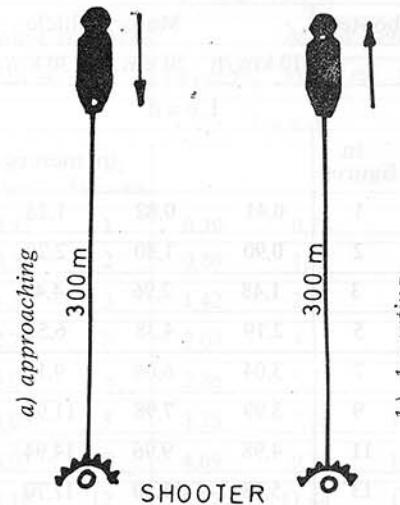


Fig. 119 — Choice of aiming point for firing at a frontal movable target

249. Lateral and oblique targets should be fired using the sight division for the target range specified, and aiming point (target centre) should be transferred from the target centre into direction of its movement. The distance over which the target travels during flight of the bullet to it is called lead.

Lead is calculated in figures (one figure = 50 cm) while in case of light machine gun the divisions on the windage scale are used too.

Table 7 shows amount of lead for respective weapons.

**Example:** A lateral target at 300 m is to be fired. The lead for any weapon is 3 figures (Fig. 120).

When firing from a light machine gun the lead can be taken into account by means of the windage scale. For this purpose the rear sight slot is to be moved into direction of target movement. If there is no time to set the windage scale division, the lead is to be calculated in figures or meters.

TABLE 7

AUTOMATIC RIFLE						
Distance in meters	Type of target					
	Running shooter	Motor vehicle				
	3 m/s	10 km/h	20 km/h	30 km/h	40 km/h	
Lead						
in meters	in figures	in meters				
100	0,44	1	0,41	0,82	1,23	1,64
200	0,97	2	0,90	1,80	2,70	3,60
300	1,60	3	1,48	2,96	4,44	5,92
400	2,36	5	2,19	4,38	6,57	8,76
500	3,29	7	3,04	6,08	9,12	12,16
600	4,30	9	3,99	7,98	11,97	15,96
700	5,38	11	4,98	9,96	14,94	19,92
800	6,35	13	5,98	11,80	17,70	23,60

LEAD BY 3 FIGURES

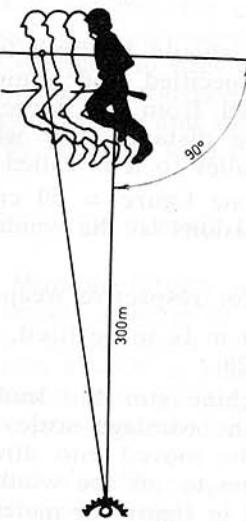


Fig. 120 — Firing at a lateral target moving at the angle of 90°

TABLE 7A

LIGHT MACHINE GUN						
Distance in meters	Type of target					
	Running shooter	Motor vehicle				
	3 m/s	10 km/h	20 km/h	30 km/h	40 km/h	
Lead						
in meters	in figures	in meters				
100	0,42	1	0,39	0,78	1,17	1,56
200	0,93	2	0,86	1,72	2,58	3,44
300	1,53	3	1,42	2,83	4,25	5,67
400	2,25	5	2,08	4,17	6,25	8,33
500	3,09	6	2,86	5,72	8,58	11,44
600	4,05	8	3,75	7,50	11,25	15,00
700	5,07	10	4,69	9,35	14,08	18,78
800	6,18	12	5,72	11,44	17,17	22,89
900	7,41	15	6,86	13,72	20,58	27,44
1000	8,73	17	8,08	16,17	24,25	32,33

250. When firing at an oblique target moving at the angle of 30°, the correction is 0,5; at the angle of 45°, the correction is 0,7 and at the angle of 60° the correction is 0,9 from the values given in Table 7.

**Example:** A target moving at the angle of 30° at 200 m is to be fired. The lead for the target moving at the angle of 90° is 2 figures, and for that moving at the angle of 30° is 1 figure.

If the enemy's soldier is walking, the lead is twice less than that for a running target.

In combat situation it is impossible to determine exactly the angle of target movement and therefore it is necessary to take the complete lead for the targets moving at an angle approximate to the right angle (90° to 60°), and half the lead if the angles are more acute (smaller than 60°).

251. Lateral and oblique movable targets should be fired by waiting and by tracking.

When firing by waiting the soldier aims at an aiming point (Fig. 121) chosen in the direction of target movement and he commences fire as soon as the target reaches that point taking into account the amount of lead specified (in figures).

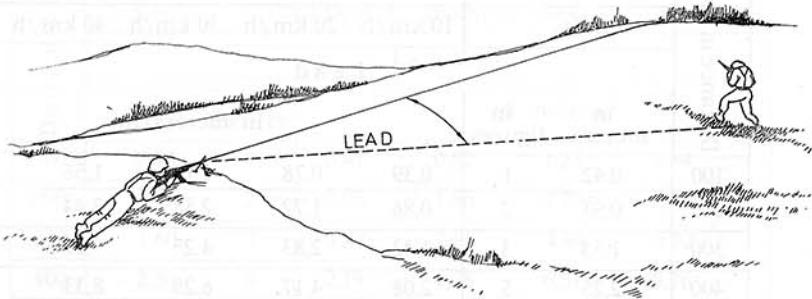


Fig. 121 — Firing at a movable target by waiting

When firing by tracking the soldier keeps aiming in front of the target by the lead specified in figures and commences fire in the most favourable moment.

When firing at movable targets with light machine gun and the lead is set by means of the windage scale, the soldier aims at the target centre.

252. With automatic rifles and light machine guns movable targets at ranges up to 200 m should be fired by long bursts. If the target is wide (line of soldiers) it should be fired by sweeping fire, whereat fire density must ensure two bullets per meter at least.

#### (4) FIRING AT CAMOUFLAGED TARGETS

253. If targets are hidden behind a mask (bush, hedge and the like) it is necessary to fire at the mask. If target position behind the mask is not known, fire at the mask gradually transferring the aiming point from one end of the mask to another. With both automatic rifle and light machine gun fire in short bursts and transfer the aiming point by the width of the most dense shot group at the distance specified.

#### (5) FIRING IN MOTION

254. While moving one can fire off his hand and in »hunter's style« — stopping or without stopping. Two-three rounds or short bursts may be fired at each stop as necessary.

255. When firing off one's hand in assault, when the target is at a range up to 100 m, commence fire in short or long bursts without stopping. In this case the weapon is held by the handguard with the left hand while the right one is on the handgrip, the elbow pressing the weapon against the right hip (Fig. 122). The weapon should be aimed at the target according to observed bullet fall. Bipod of light machine gun may be released or folded, and sling put over the left lower arm (between the body and weapon) or over the left shoulder.



Fig. 122 — Firing off one's hand

256. When the target is at a range above 100 m it is to be fired in »hunter's style« stopping for a while or without stopping.

To fire in »hunter's style« stopping for a while, the soldier stops with his left leg forward and, without making another step with his right leg to put them together, he brings the rifle to the shoulder joint (Fig. 123), aims at the target, fires and goes on.

257. To fire in »hunter's style« without stopping the soldier brings the rifle to his shoulder joint while making a step with his right leg and aims and fires while making a step with his left leg (Fig. 124), then proceeds moving.

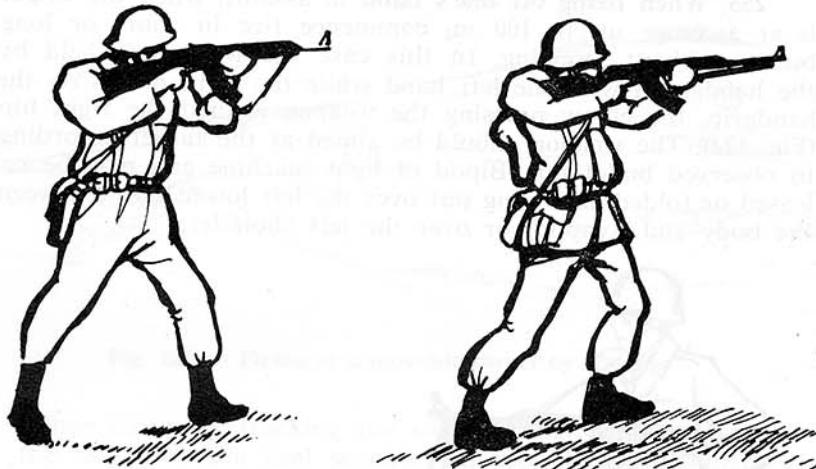


Fig. 123 — Firing in hunter's style stopping for a while

Fig. 124 — Firing in hunter's style without stopping

258. If the enemy suddenly appears at close ranges (in a wood, town, etc), the soldier fires from any position aiming the weapon barrel at the target. In this case the folding stock of automatic rifle or light machine gun may be folded.

#### (6) FIRING UNDER CONDITIONS OF LIMITED VISIBILITY

259. At night and generally under conditions of limited visibility, illuminated targets, and those which can be seen by the moonlight should be fired in the same manner as at daylight. The soldier must aim and commence fire at the moment when the target is illuminated. At the moments of illumination the soldier must not look at the light source (flare, illuminating grenade, reflector) since the light may cause dazzling.

260. At twilight the soldier raises (sets) the rear and front night sight and check the tritium marks for correctness. Targets discovered by flash should be fired by means of night sights as follows: The soldier observes flash, aligns the tritium mark of the front and rear night sights, then brings the flash above the tritium mark of the front sight (Fig. 125) and commences fire.



Fig. 125 — Aiming by means of night sight at a target discovered by flash

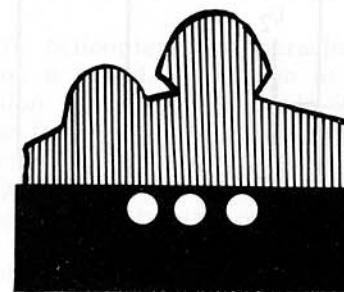


Fig. 126 — Aiming at target silhouette by means of night sight

When firing at a target silhouette, the tritium mark of front sight (aligned with the rear sight marks) should be aligned with the silhouette centre (Fig. 126).

For firing at dawn and at twilight it is better to use night sights instead of daylight sights.

261. When aiming at night by means of the **passive sight 5×80** the top of reticle must be aligned with the bottom of the aiming point. The aiming point on the target depends on target size and firing range. When firing at small targets (head target and the like) at ranges up to 200 m, the aiming point is the target centre. When firing at larger targets (half or complete figure

of a man) the aiming point is at ranges up to 200 m about 10 cm below the target centre, at 300 m — target centre, at 400 m — middle of upper half of the target, and at 500 m — middle of the top edge of visible target silhouette (Fig. 127). ,

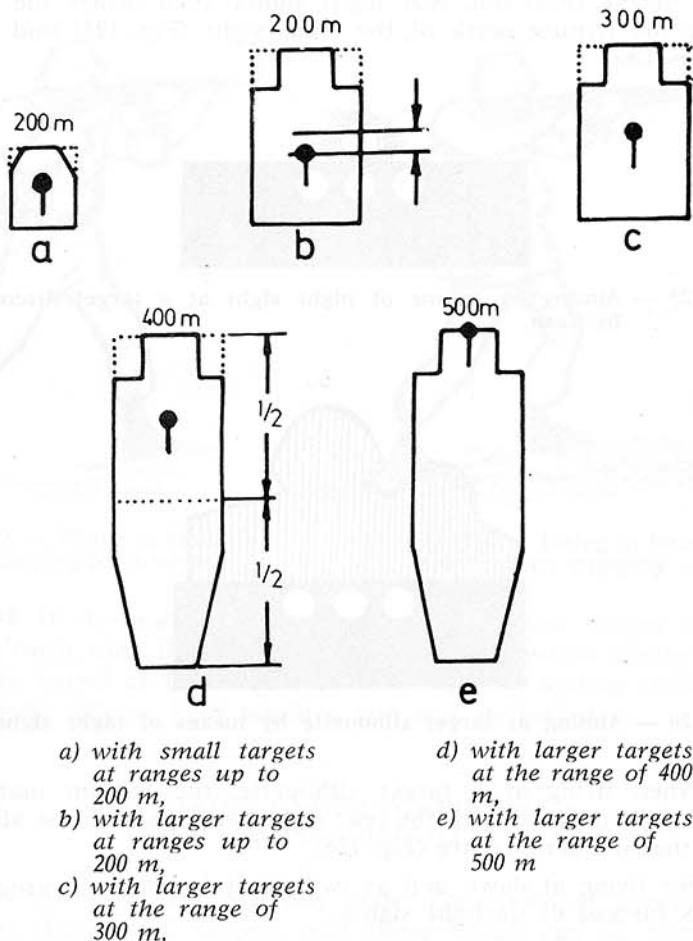


Fig. 127 — Choice of aiming point with passive sight 5x80

Firing at night with tracing bullets using the passive sight should be applied only exceptionally and for aiming corrections. When firing with tracing bullets the soldier reveals his position and attracts enemy's attention.

## (7) FIRING IN THE MOUNTAINS

**262.** When firing in the mountains, due to lower air density, range of bullet increases in regards to that on flat ground. For this reason it is necessary to make corrections (Appendix 5). In this case the range of bullet is also influenced by large angular sizes of targets.

## (8) FIRING UNDER PROTECTIVE MASK

**263.** Firing under protective mask should be made in the same manner as without it but the soldier must be trained how to use it.

Before firing it is necessary to wipe the glass of the protective mask by a soapy patch to prevent steaming up.

## (9) FIRING AT AIR TARGETS

**264.** Aircrafts, helicopters and parachutists should be fired by weapons from a squad — platoon at ranges up to 500 m, with sight division »3« or with slide in its basic position. Aircrafts should be fired only at the command, and parachutists either at the command or at own initiative.

The most favourable moment for firing at an aircraft is when it is diving toward the unit or when it is going away after diving. In this case it is to be fired without lead, aiming at the pilot cab of a diving aircraft or at the tail of a leaving aircraft. Light machine gunner and shooters armed with automatic rifles engage the target by automatic fire or long bursts. Since the aircraft dives at a high speed, firing should commence when the target is at the range of about 700 m.

**265.** Aircrafts in horizontal flight (under various course angles) should be fired by tracking, taking specified lead into account. The lead is to be calculated and taken into account by visible figures. If the target is fired by tracking, the line of sight is to be directed in front of the target by the amount of lead specified and fire commences in the most favourable moment.

Table 8 shows the amount of lead if an aircraft is flying at the right angle (90°) in regards to direction of firing.

**266.** In combat situation, using the Table 8 each soldier makes in advance a lead table for aircrafts by figures taking

into account their size and speed. In order to make the lead table for aircrafts by figures it is necessary to divide the lead in meters by the length of fuselage.

**Example:** Aircraft speed is 275 km/h, its length 15 m, and range of fire is 300 m. The lead in meters (Table 8) is 41 m for AR, 39 m for LMG; the lead in figures (Fig. 128) is 3 figures for both AR and LMG.

LEAD BY  $2\frac{1}{2}$  FUSELAGE

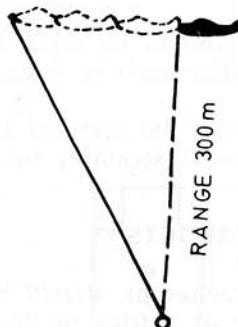


Fig. 128 — Firing at aircrafts

267. When firing at aircrafts flying at speeds above 500 km/h, the procedure of lead estimate and setting is much more complicated and it can amount to several hundred meters.

To provide for firing at such targets it is necessary to apply firing by traces of tracing bullets, barrage fire or a combination of these two methods.

TABLE 8

Firing range in meters										
100		200		300		400		500		
		Lead in meters								
AR	LMG	AR	LMG	AR	LMG	AR	LMG	AR	LMG	
100	4	4	9	9	15	14	22	21	30	29
125	5	5	11	11	18	18	27	26	38	36
150	6	6	13	13	22	21	33	31	46	43
175	7	7	15	15	26	25	38	36	53	50
200	8	8	18	17	30	28	44	42	61	57
225	9	9	20	19	33	32	49	47	68	64
250	10	10	22	21	37	35	55	52	76	71
275	11	11	25	24	41	39	60	57	84	79
300	12	12	27	26	45	43	66	63	92	86

268. For firing at parachutists the aiming point should be moved in direction of landing. The lead is to be calculated by the parachutist's figure size (Fig. 129). The figure is calculated for a target size 1,5 m taken from the parachutist's feet.

Table 9 shows amount of lead for firing at parachutists.

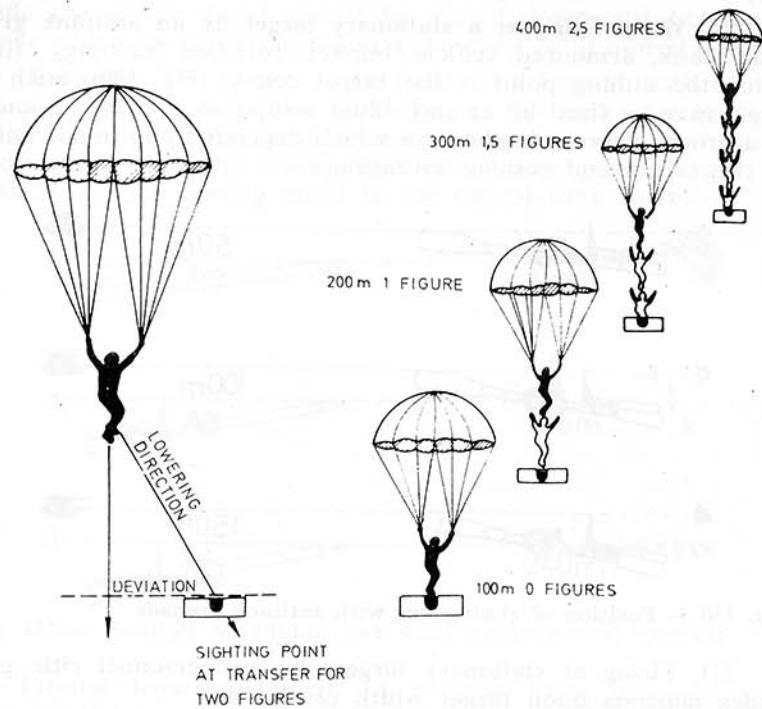


Fig. 129 — Choice of aiming point for firing at a parachutist

TABLE 9

Speed of parachutist's landing	Type of weapon	Lead	Firing range in meters				
			100	200	300	400	500
6 m/s	AR	in meters	0.15	1.19	2.65	3.97	5.83
	LMG		0.10	1.11	2.28	3.75	5.43
	AR	in figures	under feet	1	1 1/2	2 1/2	4
	LMG		under feet	1	1 1/2	2 1/2	3 1/2

## (10) FIRING WITH RIFLE GRENADES

**269.** The soldier — grenade shooter in firing must particularly see that there are no obstacles in front of the launcher in direction of firing which could be hit by the grenade on its flight to the target.

**270. When firing at a stationary target by an antitank grenade** (tank, armoured vehicle, bunker, fortified building, fire arms) the aiming point is the target centre (Fig. 130). Such a target may be fired by an individual soldier — grenade shooter or a group of grenade shooters which depends upon importance of the target and combat situation.

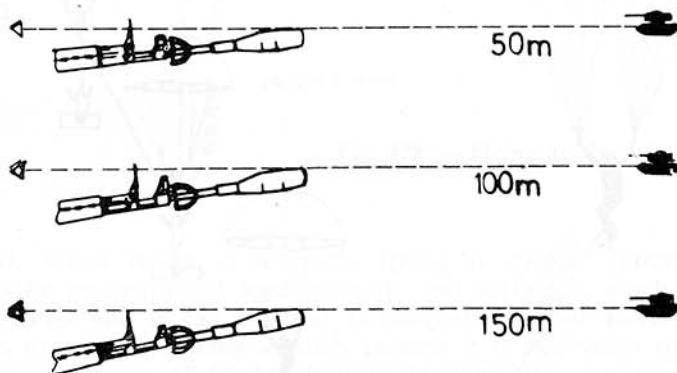


Fig. 130 — Position of aiming line with antitank grenade

**271. Firing at stationary targets by antipersonnel rifle grenades depends upon target width or depth.**

When firing at a wide target the central soldier — grenade shooter (commander of the group) fires at target centre, and the soldiers on the left and right from him fire left-right by the radius width of grenade effective zone so that target is beaten evenly along its whole width or on its most dense section.

When firing at a deep target the central soldier — grenade shooter (commander of the group) fires at the target centre, the shooters on the right fire from the centre to the rear, while the soldiers on the left fire from the centre to the target front (by radius width of the grenade effective zone) so that the target is evenly beaten along its whole depth or on its most dense section.

When the complete target cannot be engaged simultaneously it is to be fired by sections.

In case of fire concentration at a smaller target, the group of grenade shooters aim at the target centre.

**272. Movable targets are classified according to item 248. When firing at a frontal approaching target by an antitank grenade** the aiming point should be moved downward or aiming made with a lower sight division and aiming point moved upward.

**Example:** The target to be fired is a frontal tank at the range of 100 m and speed of 15 km/h. The tank may be fired with the sight division »100« and aiming point is the bottom (bottom part of the track). In case of aiming with sight division »50« the aiming point is the top of tank turret.

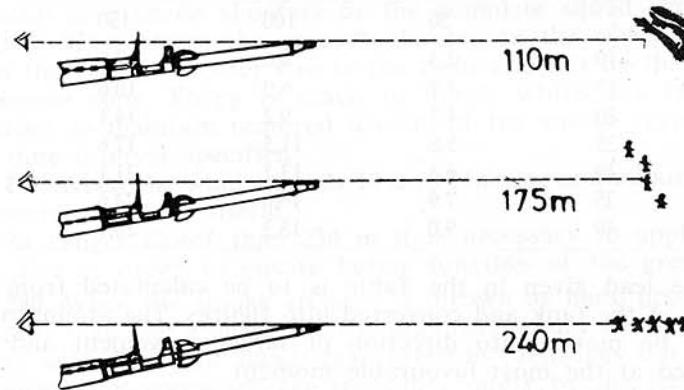


Fig. 131 — Position of aiming line with antipersonnel grenade

**Frontal departing targets** can be fired using the sight division for the range specified when the aiming point is the turret top, or using a higher sight division and a lower aiming point.

**273. Firing at frontal movable targets by an antipersonnel grenade** (Fig. 131) should be made with such a calculation that the grenade bursts when the target is within the radius of its effective zone. For this purpose it is necessary to take into account the time of grenade flight at the firing range and target speed.

**Example:** Firing at infantry in assault at the range of 300 m. Target speed 4 m/s. Time of flight of an antipersonnel grenade fired from an automatic rifle at the range of 300 m is 5s. Within this time the target will pass 16 m which means that

the grenade shooter in this case must aim in front of the target to be sure that it will be within the radius of grenade effective zone.

**274. To fire at lateral movable targets by an antitank grenade** it is necessary to use the sight division which corresponds to the target range specified, to take the lead into account and to aim at the target centre.

Amounts of lead for a target moving at the angle of 60° in regards to direction of firing are given in Table 10.

TABLE 10

Tank speed in km/h	Firing range with AR in meters		
	Lead in meters		
	50	100	150
10	2,3	4,6	7,0
15	3,4	6,9	10,6
20	4,5	9,2	14,1
25	5,6	11,5	17,6
30	6,8	13,7	21,1
35	7,9	16,0	24,6
40	9,0	18,3	28,1

The lead given in the Table is to be calculated from the middle of the tank and converted into figures. The aiming point should be moved into direction of target movement and fire delivered at the most favourable moment.

Lateral and oblique targets should be fired by **tracking and waiting**.

**275. Oblique movable targets** should be fired in the same way as the lateral ones. To fire at oblique targets the lead values given in Table 10 should be multiplied and reduced by 0,5 when the target is moving at the angle of 30°, by 0,7 when the target is moving at the angle of 45°, and by 0,9 when the target is moving at the angle of 60°.

**276. Illuminated targets** at night should be fired by rifle grenades in the same manner as at daylight, while the targets which are not illuminated should be fired only if they can be surely hit.

**277. Smoke rifle grenade** is used to make smoke in order to mask a group of soldiers, firing squad and platoon (in assault, escape from the battle and the like) and to put enemy's observation posts and fire positions out of action.

The most favourable condition for firing with smoke grenade is in case of lateral wind, speed up to 5—7 m/s, which keeps blowing in the same direction and at the same speed, on wet and cloudy weather, in the morning or in early evening hours, on rather flat ground and hard ground.

With lateral wind or wind blowing in the direction of firing, the shot must be 25—30 m from the target so that smoke develops in front of the target and covers it, while if the wind is blowing from the target to the soldier the shot must be on the target itself.

**278. For blinding the enemy's fire positions and observation posts** first fire one grenade and estimate the success of blinding, and then maintain required smoke density by single firing.

Firing in order to make smoke curtain is to be made by a group of grenade shooters or the complete squad according to item 271 whereat the grenade shooter on the right and left from the central shooter fire to the right and left by the length of smoke cone. Firing is made in bursts which are repeated in order to maintain required density of the smoke curtain for the time interval specified.

**279. When the wind exceeds 10 m/s blinding and making smoke curtains is not useful.**

At ranges closer than 250 m it is necessary to apply indirect fire in order to ensure better function of the grenade.

**280. When the smoke grenade is thrown by hand** proceed as follows: take the grenade by the stabilizer under the transport safety with the right hand; take grenade cartridges out of the stabilizer and screw off the transport safety by the left hand; strike with the stabilizer rear part forcefully against a hard object (stone, wood) whereat the primer explodes (like with hand grenades), and throw the grenade.

**281. To fire an illuminating rifle grenade** instead of aiming through the grenade launching sight the rifle is elevated as much as necessary in the direction of ground to be illuminated.

**282. Illumination of ground** is to be performed in the following manner:

— if the ground to be illuminated is at the same level with the soldier — grenade shooter's position, fire at the angle of 45° and the grenade will reach approximately 250 m; the parachute opens at the height of 120 m and provides for most effective use of illuminating torch;

— if the ground is higher than the soldier — grenade shooter's position (when illuminating a hill from a valley), fire at

an angle higher than 45°; the range is smaller but the height at which the parachute opens is increased; and

— if the ground is lower than the soldier — grenade shooter's position (when illuminating a valley from a hill), fire at an angle lower than 45°; the range increases and the height at which the parachute opens decreases.

**283.** When the wind is blowing during firing, the parachute with illuminating torch sinks and the wind pushes it into direction of blowing. This must be particularly kept in mind when firing against the wind so as not to illuminate own units since the grenade range is relatively small in regards to the height at which the torch begins to burn.

If the need arises to fire against the wind, it is necessary to decrease the angle of firing in order to reduce the height at which the torch begins to burn.

**284.** If the illuminating torch falls down on the ground and burns out it can set fire to easily inflammable materials and cause a big fire. This fact must be kept in mind during firing.

In case of an intention to set fire, the firing should be made at an angle lower than 45°.

#### 6) CEASE OF FIRE AND STOP FIRING

**285.** Fire is ceased at the command »CEASE!« or at own initiative. At this command the soldier locks the weapon (safe position) and brings the sight down in its basic position if it has been raised. If the rounds have been fired, the weapon should be loaded with another full magazine if necessary.

**286.** At the command »CEASE — UNLOAD« the soldier — grenade shooter first locks the rifle, pulls the rifle back and screws on the transport safety — cap onto the grenade, takes off the grenade from the launcher, puts it aside and unloads the rifle.

#### 7) CHANGE OF FIRING SITE

**287.** Firing site is to be changed at the command or at own initiative — if the task assigned requires it. The command specifies direction of movement, how to move and place on the new line. The soldier in combat moves with quick steps, jumping or crawling which depends upon enemy's fire and ground.

Before moving to a new line (position) the soldier loads his weapon with a new magazine (or fills it up if necessary) and locks it (safe position); then he puts his legs together, places the palms of his hands on the ground, gets up quickly making a step out with his left leg, while the gunner steps out with his right leg first and then with the left one, takes hold of the weapon by the handguard with his right hand and proceeds with movement.

## APPENDICES

## APPENDIX 1

TECHNICAL DATA FOR WEAPON	AR	LMG
1. Mass of weapon with wooden stock, without magazine, kg	3,75	5
2. Mass of weapon with folding stock, without magazine, kg	3,7	5
3. Mass of full 30-round magazine, g	850	850
4. Mass of empty 30-round magazine, g	360	360
5. Mass of full 75-round drum, kg	—	2,175
6. Mass of empty drum, g	—	900
7. Mass of live cartridge M67, g	17	17
8. Mass of bullet of live cartridge M67, g	8	8
9. Mass of accessories with 4 full magazines, kg	4,415	4,215
10. Length of weapon (AR and LMG with wooden stock), mm	925	1025
11. Length of AR with knife, mm	1050	—
12. Length of AR with folded stock, mm:		
— with knife	790	—
— without knife	640	—
13. Length of line of sight, mm	395	525
14. Muzzle velocity of bullet M67, m/s	720	748
15. Practical rate of fire, rds/min	120	120
16. Cyclic rate of fire, rds/min	600	600
17. Mass of knife with scabbard for AR, g	460	—

## APPENDIX 3

 ELEMENTS OF TRAJECTORIES OF BULLET 7,62 mm M67 WHEN  
 FIRING FROM AR AND LMG WITHIN THE LIMITS OF  
 MAXIMUM RANGE

Angle of departure $\theta_0$	Range	Angle of fall $\theta$		Ordinate of trajectory vertex $Y_s$	Abscissa of trajectory vertex $X_s$	Time of flight $t_c$	Terminal velocity $V_c$	Bullet energy							
		m	mils					J	AR LMG						
0	mils	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG						
1	16,67	730	759	31,5	31,5	4,5	4,8	422	442	1,86	1,90	266,6	266,0	248,3	283,0
2	33,33	1038	1067	70,7	72,6	13,6	14,2	608	630	3,21	3,27	195,0	194,0	152,1	150,5
3	50,00	1244	1276	118	120	25,5	26,5	746	769	4,40	4,48	155,9	155,0	97,2	96,1
4	66,67	1396	1429	171	175	39,5	40,9	856	879	5,48	5,56	132,7	131,9	70,4	69,6
5	83,33	1516	1549	228	233	55,3	57,1	945	968	6,47	6,56	117,4	116,7	55,1	54,5
10	166,67	1885	1917	521	529	152	156	1228	1252	10,62	10,73	85,9	85,7	29,5	29,4
15	250,00	2082	2113	770	778	267	273	1384	1408	14,02	14,15	79,4	79,5	25,2	25,3
20	333,33	2196	2227	952	960	394	402	1477	1501	17,01	17,17	79,7	79,9	25,4	25,5
25	416,67	2255	2285	1082	1089	527	538	1527	1552	19,75	19,92	82,0	82,2	26,9	27,0
30	500,00	2271	2300	1176	1180	665	678	1545	1569	22,29	22,48	84,6	84,9	28,6	28,8
35	583,33	2250	2278	1244	1248	804	819	1534	1557	24,67	24,88	87,0	87,2	30,3	30,4
40	666,67	2195	2221	1296	1300	942	959	1497	1519	26,91	27,14	88,9	89,1	31,6	31,8
45	750,00	2108	2132	1336	1339	1077	1096	1436	1456	29,01	29,26	90,5	90,7	32,8	32,9
50	833,33	1989	2012	1367	1369	1206	1227	1351	1370	30,96	31,23	91,7	91,9	33,6	33,8
60	1000,00	1662	1680	1412	1414	1439	1463	1116	1131	34,37	34,66	93,3	93,4	34,8	34,9
70	1166,67	1215	1228	1445	1447	1625	1651	801	812	36,99	37,31	94,2	94,3	35,5	35,6
80	1333,33	653	660	1473	1473	1746	1774	421	426	38,67	39,00	94,7	94,8	35,9	35,9

NOTE:

Maximum ranges of bullet 7,62 mm M67 are:

- 2271,1 m from automatic rifle at the angle of 30°
- 2300,1 m from light machine gun at the angle of 30°

## LIVE CARTRIDGE 7,62 mm M67

 $V_o = 720 \text{ m/s}$ 

TABLE OF TRAJECTORY ORDINATES

a) for AR

Sight	R A N G E (M)									
	50	100	150	200	250	300	350	400	450	500
1	0.03	0.00	-0.09	-0.26	-0.52	-0.89				
2	0.09	0.13	0.10	0.00	-0.19	-0.50	-0.93	-1.52		
3	0.18	0.30	0.35	0.33	0.22	0.00	-0.35	-0.85	-1.54	-2.42
4	0.28	0.51	0.67	0.76	0.76	0.64	0.40	0.00	-0.57	-1.35
5	0.42	0.78	1.08	1.30	1.43	1.46	1.35	1.09	0.65	0.00
6	0.58	1.11	1.58	1.97	2.26	2.45	2.51	2.41	2.14	1.66
7	0.78	1.51	2.17	2.76	3.25	3.64	3.89	3.99	3.92	3.64
8	1.01	1.97	2.86	3.68	4.40	5.02	5.50	5.83	5.99	5.94

b) for LMG

Sight	R A N G E (M)									
	50	100	150	200	250	300	350	400	450	500
1	0.02	0.00	-0.09	-0.24	-0.48	-0.82				
2	0.07	0.12	0.09	0.00	-0.18	-0.46	-0.85	-1.39		
3	0.16	0.27	0.32	0.31	0.20	0.00	-0.32	-0.78	-1.41	-2.22
4	0.26	0.47	0.62	0.69	0.69	0.58	0.36	0.00	-0.53	-1.25
5	0.38	0.72	0.97	1.20	1.32	1.34	1.24	1.00	0.60	0.00
6	0.54	1.03	1.46	1.82	2.09	2.27	2.32	2.24	1.99	1.55
7	0.73	1.40	2.01	2.56	3.02	3.38	3.63	3.73	3.67	3.41
8	0.94	1.84	2.67	3.43	4.11	4.69	5.15	5.47	5.62	5.59
9	1.20	2.34	3.43	4.44	5.38	6.21	6.92	7.50	7.90	8.12
10	1.49	2.93	4.31	5.62	6.85	7.97	8.98	9.85	10.55	11.06

R A N G E (M)									
550	600	650	700	750	800	850	900	950	1000
									1
									2
									3
-2.3	-3.6								4
-0.8	-1.9	-3.3	-5.0						5
1.0	0.0	-1.2	-2.7	-4.6	-6.8				6
3.2	2.4	1.4	0.0	-1.6	3.6	-6.0	-8.9		7
5.7	5.2	4.4	3.3	1.8	0.0	-2.1	-4.8	-7.9	-11.5
									8

 $V_o = 748 \text{ m/s}$ 

R A N G E (M)									
550	600	650	700	750	800	850	900	950	1000
									1
									2
									3
-2.1	-3.3								4
-0.8	-1.8	-3.1	-4.7						5
0.9	0.0	-1.1	-2.5	-4.3	-6.4				6
3.0	2.3	1.3	0.0	-1.5	-3.4	-5.7	-8.4		7
5.4	4.9	4.1	3.1	1.7	0.0	-2.0	-4.5	-7.4	-10.9
8.2	7.9	7.4	6.6	5.5	4.1	2.3	0.0	-2.6	-5.8
11.4	11.5	11.3	10.8	9.9	8.8	7.3	5.3	3.0	0.0
									10

## APPENDIX 5

## CORRECTIONS OF DIRECTION AND ELEVATION DUE TO METEOROLOGICAL-BALLISTIC FACTORS

Range	Corrections of direction due to horizontal wind blowing at the angle of 90° and speed of 10 m/s						Corrections of elevation in meters due to						
	AR		LMG		Longitudinal wind speed 10 m/s	Air temperature change $\Delta t = 10^\circ \text{C}$	Barometric pressure change $\Delta h = 10 \text{ mbar}$	Muzzle velocity change $\Delta V_0 = 10 \text{ m/s}$	AR	LMG	AR	LMG	AR
m	m	0-00 fig.	m	0-00 fig.	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG	AR LMG
100	0,11	1,13	0,2	0,11	1,06	0,2	0,01	0,01	0,01	0,01	0,01	0,01	0,01
200	0,49	2,46	1,0	0,46	2,31	1,0	0,03	0,03	0,04	0,04	0,08	0,07	0,02
300	1,21	4,02	2,5	1,13	3,78	2,4	0,09	0,07	0,10	0,09	0,13	0,12	0,03
400	2,32	5,80	4,9	2,20	5,49	4,6	0,19	0,16	0,20	0,18	0,21	0,19	0,06
500	3,81	7,62	8,0	3,65	2,29	7,6	0,35	0,32	0,36	0,33	0,30	0,28	0,10
600	5,62	9,37	11,8	5,43	9,05	11,4	0,61	0,55	0,60	0,56	0,42	0,39	0,15
700	7,73	11,04	16,2	7,51	10,73	15,7	0,91	0,89	0,89	0,89	0,52	0,49	0,23
800	10,16	12,70	21,3	9,91	12,39	20,8	1,45	1,37	1,37	1,37	0,69	0,69	0,34
900				12,68	14,09	26,6							
1000				15,89	15,89	33,3							

## NOTE:

Correction in figures is calculated for a target 0,50 m wide.

## APPENDIX 6

Range	ZONE SWEPT BY FIRE							
	TYPE OF TARGET							
Range	Head and shoulder target $h=0,3 \text{ m}$		Chest figure $h=0,5 \text{ m}$		Waist figure $h=1,0 \text{ m}$		Running (standing) figure $h=1,5 \text{ m}$	
m	AR	LMG	AR	LMG	AR	LMG	AR	LMG
100								
200								
300	53	58						
400	31	34	52	57				
500	20	21	33	36	66	71		
600	14	15	23	24	46	49	69	73
700	10	11	17	18	33	35	50	53
800	8	8	13	13	25	27	38	40
900		6			10		20	
1000		5			8		16	24

## APPENDIX 7

INFLUENCE OF ANGLE OF SITE UPON AMOUNT  
OF OBLIQUE RANGE  
live cartridge 7,62 mm M67

a) for AR

Angle of site	Range									
	100	200	300	400	500	600	700	800	900	1000
0	n	n	n	n	n	n	n	n	n	
80	397	636	842	1035	1210	1362	1491	1596		
70	247	429	587	740	892	1038	1172	1294		
60	183	335	471	602	734	865	992	1111		
50	148	281	404	523	641	761	897	993		
40	127	246	360	471	582	693	804	913		
30	114	224	332	438	543	649	755	859		
20	107	210	313	416	518	621	723	825		
10	101	203	303	404	504	605	705	804		
0	100	200	300	400	500	600	700	800		
-10	101	203	304	404	505	605	706	807		
-20	103	210	314	414	519	421	725	828		
-30	114	224	334	438	544	650	757	864		

b) for LMG

Angle of site	Range									
	100	200	300	400	500	600	700	800	900	1000
80	394	635	838	1025	1201	1357	1490	1600	1689	1256
70	244	430	587	735	886	1032	1168	1292	1404	1505
60	181	336	472	600	731	861	989	1109	1222	1328
50	146	281	405	521	640	758	877	991	1102	1207
40	125	246	361	471	581	692	803	912	1019	1123
30	112	224	332	437	543	448	754	859	963	1045
20	104	210	314	416	518	620	723	825	926	1027
10	101	202	304	404	504	605	705	806	906	1004
0	100	200	300	400	500	600	700	800	900	1000
-10	101	202	304	404	505	605	706	807	908	1009
-20	104	210	314	416	518	621	724	827	930	1032
-30	112	224	333	437	543	649	756	862	969	1024

## APPENDIX 8

## CHARACTERISTICS OF HIT PATTERN

Range	AUTOMATIC RIFLE						LIGHT MACHINE GUN	
	First shots from the burst		Next shots from the burst		Mean point of impact	Summarized hit patterns	First shots from the burst	
	Vvj	Vpj	Vvr	Vpr			Vvj Vpj	Vvr Vpr
100	0,04	0,04	0,07	0,09	0,05	0,04	0,08 0,10	0,02 0,03
200	0,08	0,07	0,14	0,19	0,10	0,08	0,17 0,21	0,05 0,06
300	0,12	0,10	0,21	0,30	0,16	0,13	0,26 0,33	0,08 0,09
400	0,17	0,14	0,29	0,41	0,22	0,18	0,37 0,45	0,12 0,13
500	0,22	0,18	0,38	0,52	0,29	0,23	0,48 0,57	0,16 0,16
600	0,28	0,22	0,48	0,64	0,37	0,29	0,61 0,70	0,20 0,20
700	0,35	0,26	0,60	0,77	0,46	0,35	0,76 0,84	0,24 0,24
800	0,43	0,31	0,74	0,90	0,56	0,41	0,93 0,99	0,28 0,28
900								0,32 0,32
1000								0,36 0,36

## NOTE:

Dispersion of the first shots from the burst is equal to that of shots in single firing.

Vvj = possible vertical deviation in single fire

Vpj = possible horizontal deviation in single fire

Vvr = possible vertical deviation in burst fire

Vpr = possible horizontal deviation in burst fire

Vvsp = possible vertical deviation of mean point of impact (M.P.I.)

Vpsp = possible horizontal deviation of M.P.I.

Vvsum = possible total vertical deviation

Vpsum = possible total horizontal deviation

## APPENDIX 9

REQUIRED NUMBER OF ROUNDS TO HIT A SINGLE TARGET BY SINGLE FIRE

Range in m	TYPE OF TARGET									
	Sheltered chest target		Chest target		Waist target		Running frontal target		Light machine gun target	
	AR	LMG	AR	LMG	AR	LMG	AR	LMG	AR	LMG
100	1	1	1	1	1	1	1	1	1	1
200	2	2	1	1	1	1	1	1	1	1
300	3	2	2	2	2	2	2	2	2	2
400	4	3	3	2	2	2	2	2	2	2
500	6	4	4	3	2	2	2	2	3	2
600	9	6	5	4	3	3	3	2	4	3
700	—	8	7	5	4	3	3	3	4	4
800	—	—	—	7	5	4	4	3	7	5
900	—	—	—	—	—	5	—	4	—	6
1000	—	—	—	—	—	6	—	5	—	8

## NOTE:

Calculation is based on the condition that mean point of impact is at the target centre.

## APPENDIX 10

REQUIRED NUMBER OF ROUNDS TO HIT A SINGLE TARGET FIRING BY SHORT BURSTS OF 3 ROUNDS

Range in m	TYPE OF TARGET									
	Sheltered chest target		Chest target		Waist target		Running frontal target		Light machine gun target	
	AR	LMG	AR	LMG	AR	LMG	AR	LMG	AR	LMG
100	3	3	3	3	3	3	3	3	3	3
200	4	3	4	3	4	3	4	3	3	3
300	6	4	4	3	4	3	4	3	4	3
400	10	7	6	5	4	3	4	3	5	4
500	15	12	8	7	5	4	5	3	6	5
600	22	17	12	10	7	5	6	4	8	8
700	—	23	17	15	9	7	7	5	12	10
800	—	—	—	20	12	10	9	7	16	13
900	—	—	—	—	—	12	—	9	—	17
1000	—	—	—	—	—	15	—	11	—	22

## NOTE:

1. Calculation is based on the condition that the mean point of impact is at target centre.
2. When firing at movable targets, the quantity of rounds is to be multiplied by 1.3.
3. When firing at night, the quantity of rounds is to be multiplied by 1.5.
4. When firing at landing vessels, the quantity of rounds is to be multiplied by 2.
5. When firing in motion stopping for a while or from kneeling position without rest, the quantity of rounds is to be multiplied by 1.6 and 2 at 100 m. and by 2 and 2.5 at longer ranges.

## APPENDIX 11

BASIC BALISTIC DATA AND ELEMENTS OF TRAJECTORY FOR ANTITANK RIFLE GRENADE FIRED FROM AUTOMATIC RIFLE

Range in m	Angle of departure (60—00)	Angle of fall in mils (60—00)	Height of grenade trajectory vertex in m	Time of grenade flight in s	Possible deviation in m	
					Vd	Vp
50	61,8	62,5	0,8	0,81	0,05	0,04
75	93	95	1,9	1,23	0,10	0,08
100	126	129	3,4	1,65	0,16	0,12
125	160	164	5,4	2,09	0,23	0,17
150	194	201	7,9	2,53	0,32	0,23

## NOTE:

Maximum grenade range of 340 m is reached at the angle of 45°

Vp = possible horizontal deviation

Vd = possible deviation per depth (overshoot/undershoot)

## APPENDIX 12

RAISING OF TRAJECTORY ABOVE WEAPON HORIZON WHEN FIRING ANTITANK RIFLE GRENADE FROM AUTOMATIC RIFLE

Sight	RANGE IN METERS					
	25	50	75	100	125	150
50	0,8	0	—	—	—	—
100	2,5	3,5	2,5	0	—	—
150	4	7	8	7	4,5	0

## APPENDIX 13

CORRECTIONS OF ELEVATION AND DIRECTION DUE TO VARIATION OF BALLISTIC AND METEOROLOGICAL FACTORS WHEN FIRING ANTITANK RIFLE GRENADE FROM AUTOMATIC RIFLE

Range in m	Correction of elevation in m due to				Correction of direction in m due to lateral wind Wy=10 m/s
	longitudinal wind Wx=10 m/s	air temperature to =10°C	atmospheric pressure h=10 mbar	muzzle velocity Vo=1 m/s	
50	0,01			0,11	0,07
75	0,03			0,26	0,15
100	0,08	0,01		0,46	0,27
125	0,16	0,02	0,01	0,73	0,43
150	0,28	0,04	0,01	1,07	0,62

## APPENDIX 14

BASIC BALLISTIC DATA AND ELEMENTS OF TRAJECTORY OF ANTI PERSONNEL RIFLE GRENADE FIRED FROM AUTOMATIC RIFLE

Range in m	Angle of departure in mils (60—00)	Angle of fall in mils (60—00)	Height of trajectory vertex in m	Time of grenade flight in s	Possible deviation in m	
					Vd	Vp
100	102,50	103,34	2,60	1,5	1,90	0,10
150	156,67	161,68	6,00	2,3	2,00	0,20
200	216,67	225,01	12,00	3,1	2,20	0,30
250	281,55	293,18	20,00	4	2,60	0,40
300	350,00	372,23	30,00	5	3,30	0,60
350	436,68	468,34	45,00	6	3,60	0,80

## NOTE:

Vd = possible horizontal deviation

Vp = possible deviation per depth (overshoot/undershoot)

## APPENDIX 15

CORRECTIONS OF DIRECTION AND RANGE DUE TO VARIATION  
OF METEOROLOGICAL FACTORS WHEN FIRING  
ANTIPERSONNEL RIFLE GRENADE FROM AUTOMATIC RIFLE

Range in m	Corrections of range in m due to			Correction of direction in m due to lateral wind $W_y = 10 \text{ m/s}$
	longitudinal wind $W_x = 10 \text{ m/s}$	air temperature $\Delta t = 10^\circ\text{C}$	barometric pressure $\Delta h = 10 \text{ mbar}$	
50	0,15	0,02	0,01	0,07
75	0,34	0,05	0,01	0,16
100	0,60	0,08	0,02	0,28
125	0,94	0,13	0,04	0,44
150	1,36	0,19	0,06	0,64
175	1,86	0,25	0,08	0,88
200	2,44	0,33	0,10	1,17
225	3,11	0,42	0,12	1,50
250	3,88	0,52	0,15	1,88
275	4,74	0,63	0,19	2,32
300	5,71	0,75	0,22	2,82
325	6,81	0,88	0,26	3,40
350	8,05	1,03	0,30	4,08
375	9,49	1,19	0,35	4,90

## APPENDIX 16

BASIC BALLISTIC DATA AND ELEMENTS OF TRAJECTORY  
FOR SMOKE GRENADE FIRED FROM AR

Range in m	Angle of departure in mils (60—00)	Angle of fall in mils (60—00)	Height of trajectory vertex in m	Time of grenade flight in s
100	95,01	100	2,50	1,44
150	146,94	156,68	6,00	2,22
200	205,56	220,11	11,40	3,03
250	268,34	290,85	19,00	3,9
300	337,51	370,84	29,00	4,87
350	421,68	466,68	44,00	5,97

## NOTE:

When firing with smoke grenade the range is shorter than with antipersonnel one by 20—25 m because of larger caliber and length of smoke grenade and because of smaller elevation angle.

**BASIC BALLISTIC DATA AND ELEMENTS OF TRAJECTORY  
FOR ILLUMINATING GRENADE FIRED FROM AR**

Angle of departure in degrees	Abscissa of the point on trajectory at which the parachute opens in m	Ordinate of the point on trajectory at which the parachute opens in m	Ordinate of the point at which the illuminating torch goes out in m	Time of grenade flight to the point at which the parachute opens in s
0	322	-97	-167	4,8
5	330	-68	-138	4,8
10	325	-46	-116	4,8
15	321	-16	-86	4,8
20	316	+9	-61	4,8
25	306	+35	-35	4,8
30	292	+62	-8	4,8
35	277	+88	+8	4,8
40	260	+110	+40	4,8
45	240	+131	+61	4,8

**NOTE:**

1. The magnitudes with minus sign (-) indicate vertical distance of the point at which the illuminating torch goes out below the weapon horizon.
2. The Appendix shows that elevation angle must not be smaller than 40° when the target is within the weapon horizon.
3. If the parachute does not open, the maximum range is 490 m.